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~ National Lightning Safety Institute ~

October 24, 2006

Section 1.5.2

Short Report on the 2006 International Conference on Lightning Protection

The 28th International Conference on Lightning Protection (ICLP) was held September 17-21, 2006 in Kanazawa, Japan. There were 540 attendees from 41 countries, including only nine Americans. The conference-invited lecture by Professor C. Bouquegneau (Belgium) described in detail the recent IEC Lightning Protection Standard IEC 62305. His presentation included a strong condemnation of ESE and CTS/DAS air terminals.

Commonly observed on commerce and industry buildings was the air terminal design of very tall (5-8m) Franklin rods. Surge protection is a standard procedure. Japan insurance companies reported $US5 billion in lightning-related insurance claims for the year 2000. This was three times higher than 10 years earlier.

NLSI co-authored a paper with C. Gomes (Sri Lanka) and M. Ahmed (Bangladesh) describing past successes to establish lightning safety institutes in several South Asian countries. Discussions were held with new interested parties from China, Colombia, and Ukraine.

A tour of the Japan Air Self-Defense Force Weather Service Squadron meteorological station at Komatsu Air Base included the SAFIR lightning detection system and a network of 28 field mills. The west central coast of Japan has considerable (unusual) winter lightning. It was in Komatsu that the well-known video of a Boeing 747 self-triggered lightning strike was captured.

See the website www.iclp2006.net for details of the conference, including the schedule and list of papers presented. Readers wishing a CD copy of all the ICLP papers should contact iclp2006CD@lightningsafety.com

The next ICLP will be in Uppsala, Sweden in June, 2008.

Organized By

ICLP2006
LOCAL ORGANIZING COMMITTEE

IEIE JAPAN
THE INSTITUTE OF ELECTRICAL INSTALLATION ENGINEERS OF JAPAN

In Cooperation with

The Association of Japan Instrumentation Industry

Association of Building Engineering and Equipment

The Building Center of Japan

Building and Equipment Life Cycle Association

The Daily Engineering & Construction News

The Denki Shinbun

Electronic Materials Manufactures Association of Japan

The Federation of Electrical Engineering Contractors Cooperative of Japan

Forum of Electrical Systems Inspection Associations

Healthcare Engineering Association of Japan

The Illuminating Engineering Institute of Japan

The Information Center for Electric Facilities Technology

The Institute of Electrical Engineers, Inc., Tokyo Section

The Institute for Areal Studies, Foundation

The Institute of Electronics, Information and Communication Engineers

The Institute of Electrostatics Japan

Institute of International Harmonization for Building and Housing

The Japan Architectural Education and Information Center

Japan Building Mechanical and Electrical Engineers Association

Japan Electric Association

The Japan Electrical Manufacturer's Association

Japan Electrical Safety & Environmental Technology Laboratories

Japan Electrical Construction Association, Inc.

Japan Electricity Engineers Association

Japan Engine Generator Association

Japan Electrical Wiring Devices and Equipment Industries Association

Japan Fire Alarms Manufacturer's Association

Japan Federation of Construction Contractors

The Kensetsutsushin Shimbun Corporation

Japan Installation Engineer Office Association

Japan Luminaries Association

Japanese Standards Association

Japan Switchboard Industries Association

Nikkan Kensetsu Sangyo Shinbun Co., Ltd.

Osaka Lightning Protection Systems Co., Ltd.

Public Buildings Association

Society of Atmospheric Electricity of Japan

The Society of Heating Air-Conditioning and Sanitary Engineers of Japan

Tohto Lightning Protection System Industrial Cooperative

The 28th International Conference on Lightning Protection

ICLP 2006

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The image of Raijin, the god of thunder, was originally painted by Sotatsu Tawaraya, the founder of Rimpa School of painting in the early 17th century. This visual image of the god of thunder must be invented in China. On wall paintings in a Dunhuang cave, we can see beings carrying drums or a large bolt. He joined in the Buddhism pantheon with the god of wind as one of the followers of Thousand-Armed Kannon (Sahasrabhuja). He is like a demon; Mahayana Buddhism converted many Hindu gods and demons into protectors of Buddhism, and so was the Chinese demon converted. The original painting, a national treasure possessed by Kennin-ji Temple in Kyoto, is rarely exhibited to public. But at Sanju-sangen-do Temple in Kyoto, you can see a fine wooden sculpture of Raijin erected in the 13th century, also a national treasure, from which Sotatsu must have taken inspiration.

Welcome Message

It is a great pleasure for me to welcome all participants and guests at the 28th International Conference on Lightning Protection (The 28th ICLP) in the historical city of Kanazawa, Japan.

ICLP is one of the most important scientific events that every two years provides the opportunity to discuss general and specific problems relevant to lightning protection in a friendly atmosphere of useful cooperation.

Lightning is a natural and random phenomenon characterized by very severe values of electrical parameters.

The protection against lightning is a subject of peculiar complexity that needs more and more a deep knowledge of the characteristics of the phenomenon as well as of the interactions and effects related to failure of the lightning current on structures, services and electrical and electronic systems. Step and touch voltages, mechanical, thermal and chemical effects, failure of electrical and electronic systems due to lightning current and electromagnetic impulsive field may cause important loss, which unfortunately may involve human life, services to the public, cultural heritage and economical values. In the last two decades a big effort has been done by the scientific community and new concept and their practical implementation have been proposed in order to reach more effective protection systems and to reduce the amount of such loss and, especially in the case of electrical and electronic systems, to reach an higher degree of reliability for these systems.

Hopefully in the future it is expected a further development of more effective lightning protection components and devices but the scientific community has the great responsibility to prove any proposed devices in a scientific sense before to accept and allow for effective protection. ICLP is aware of this responsibility to promote good practice and to warn against the use of devices that might jeopardize the required degree of protection and to prevent any promotion and advertising of devices and systems that are, or may be, dangerous.

Since the beginning of the Conference, more than forty years ago, the need of scientific based methodologies for the lightning protection was very clear to the group of scientists, which first activated the ICLP. The aim of this group was to organize an interdisciplinary forum for the exchange of scientific knowledge and information in the fields of lightning protection technology; after forty years nothing was loosen of the initial spirit, even if the interest of the ICLP was enlarged to the protection of electronic systems, the protection of power and communication systems and the Conference became really international with valuable contributions presented by scientists of more than 30 countries.

The result of the research works of the last decades have been transferred to the international standard on lightning protection which now are based not only on the traditional experience

of different countries but also on a background discussed and validated in a scientific environment.
As in the past editions the selected contribution will be presented and discussed in 11 Sessions each of them under the responsibility of a Chairman in cooperation with a Moderator, which will emphasize the main ideas and problems and will encourage discussions among participants.
I would like to express my sincere gratitude to the Scientific Committee Members of the ICLP for their continuous support in the decisions and the valuable help in the revision of the contributions and in the scientific organization of different Sessions.

The ICLP is hosted in Japan for the first time ever if since the beginning of the Conference more than forty years ago; the contributions given by Japanese scientists to the lightning protection technology were always of very high scientific level.
I would like to address a special warm thanks to Prof. Dr. Tatsuo Kawamura, Honorary Chairman and to Prof. Dr. Shigeru Yokoyama-Chairman of the Organizing Committee of the 28th ICLP 2006, to the members of the Organizing Committee and to all persons involved in the Conference organization, for their effort to ensure a successful meeting.

Finally, it is also important to mention about the city of Kanazawa, one of the most attractive cities of Japan and reach of charm, art and history. We are grateful to Organizers to have selected the historical city of Kanazawa as the place for the 28th ICLP; I am sure that in this beautiful city all the participants, guests and accompanying persons, also coming from countries with different cultures and languages, will find motives of cultural interest. I wish all of you a successful Conference and a pleasant stay in Kanazawa.

Carlo Mazzetti
ICLP President

Conference Organization

Conference Organization Members:

ICLP President	Prof. C. Mazzetti, Italy
Vice-President	Prof. Z. Flisowski, Poland

Scientific Committee	Prof. C. Mazzetti, Italy (President)
	Prof. Z. Flisowski, Poland (Vice-President)
	Prof. D. Agoris, Greece
	Prof. I. Berta, Hungary
	Prof. C. Bouquegneau, Belgium
	Prof. V. Cooray, Sweden
	Prof. O. Farish, United Kingdom
	Prof. W. Hadrian, Austria
	Prof. F. Heidler, Germany
	Prof. T. Kawamura, Japan
	Prof. M. Loboda, Poland
	Prof. C. A. Nucci, Italy
	Prof. F. Rachidi, Switzerland
	Prof. V. Rakov, USA
	Mr. A. Roussseau, France
	Prof. A. Piantini, Brazil

Honorary Members of	Prof. T. Horvath, Hungary
Scientific Committee	Dr. J. Huse, Norway
	Prof. S. Lundquist, Sweden
	Prof. C. Menemenlis, Greece
	Mr. E. Montandon, Switzerland
	Prof. A. E. Pedersen, Denmark
	Prof. V. Scuka, Sweden
	Prof. J. Wiesinger, Germany

Chairman and Moderators:

Session	Chairman	Moderator
1	1. Prof. S. Visacro F.	1. Prof. A. M. Hussein
	2. Prof. E.P. Krider	2. Dr. M. Bernardi
	3. Prof. V. Rakov	3. Dr. T. Shindo
2	Dr. G. Diendorfer	Prof. M. Loboda
3	Prof. T. Kawamura	Prof. A. Borghetti
4	Prof. T. Horvath	Prof. V. Cooray
5	Prof. C. Bouquegneau	Prof. W. Hadrian
6	1. Prof. C. A. Nucci	1. Prof. A. Piantini
	2. Prof. S. Yokoyama	2. Prof. V. Shostak
	3. Prof. H. Torres	3. Prof. R. Thottappillil
7	Mr. E. Montandon	Prof. F. Heidler

8	Prof. Z. Flisowski	Prof. F. Rachidi
9	Prof. I. Berta	Prof. W. Zischank
10	Prof. C. Mazzetti	Mr. A. Rousseau
11	Prof. D. Agoris	Dr. T. Sorensen

Local Organizing Committee:

Honorary Chairman	Prof. Emeritus & Dr. Tatsuo Kawamura, The University of Tokyo
Chairman	Prof. & Dr. Shigeru Yokoyama, Central Research Institute of Electric Power Industry /Kyushu University
Program Committee Chairman	Prof. & Dr. Masaru Ishii, The University of Tokyo
Secretary General	Dr. Takatoshi Shindo, Central Research Institute of Electric Power Industry

Members

Prof. A. Ametani, Doshisha University
Mr. F. Amemiya, NTT Advance Technology Co., Ltd.
Dr. S. Arinaga, Mitsubishi Heavy Industry Co., Ltd.
Dr. H. Fujinami, Central Research Institute of Electric Power Industry
Mr. E. Hayashi, Kansai Electric Power Company
Mr. H. Sasaka, East Japan Railway Company
Mr. K. Fujioka, West Japan Railway Company
Mr. M. Ito, Sankosha Corporation
Mr. T. Kageyama, NTT Facilities, Inc.
Prof. Z. Kawasaki, Osaka University
Mr. Y. Muto, Chubu Electric Power Company
Mr. S. Kitajima, Murata Electric Works Co., Ltd.
Mr. S. Komami, Hokuriku Electric Power Company
Prof. N. Kuwabara, Kyushu Institute of Technology
Dr. N. Kuwaki, Nippon Telegraph and Telephone East Corporation
Mr. R. Hashiura, Nikken Sekkei Limited
Prof. H. Sakurano, Ishikawa National College of Technology
Mr. H. Shimokawa, The Institute of Electrical Installation Engineers of Japan (IEIEJ)
Prof. T. Takahashi, Kanto-gakuin University
Prof. K. Masugata, Toyama University
Prof. K. Michishita, Shizuoka University
Dr. K. Michimoto, Japan Defence Agency
Mr. T. Miki, Japan Lightning Protection System Industrial Association
Dr. H. Motoyama, Central Research Institute of Electric Power Industry
Mr. H. Nakamura, NTT Docomo Hokuriku, Inc.
Mr. S. Nishizawa, Hakusan Manufacturing Co., Ltd.
Dr. S. Okabe, Tokyo Electric Power Company
Mr. M. Okai, Central Japan Railway Company
Prof. K. Okumura, Shibaura Institute of Technology
Mr. S. Ota, Shoden Corporation
Mr. S. Sakuma, Ryosai Technika Co., Ltd.
Dr. K. Shimada, Railway Technical Research Institute
Mr. K. Tsuge, NGK Insulators, Ltd.
Dr. T. Yamagiwa, Japan AE Power Systems Corporation
Dr. H. Yamane, Nippon Telegraph and Telephone Corporation
Prof. M. Yoda, Aichi Institute of Technology
Mr. O. Yoshida, Otowa Denki Co., Ltd.
Prof. N.J.Vasa, Indian Institute of Technology
Prof. N. Watanabe, Polytechnic University

Conference Office Address:

THE INSTITUTE OF ELECTRICAL INSTALLATION ENGINEERS OF JAPAN (IEIEJ) :

1-12-5, Hongo Bunkyoku Tokyo 113-0033 Japan
Phone: +81-3-5805-3375
Fax: +81-3-5805-3265
E-mail: iclp@ieiej.or.jp
Web site: http://www.iclp2006.net

General Information

Scope:

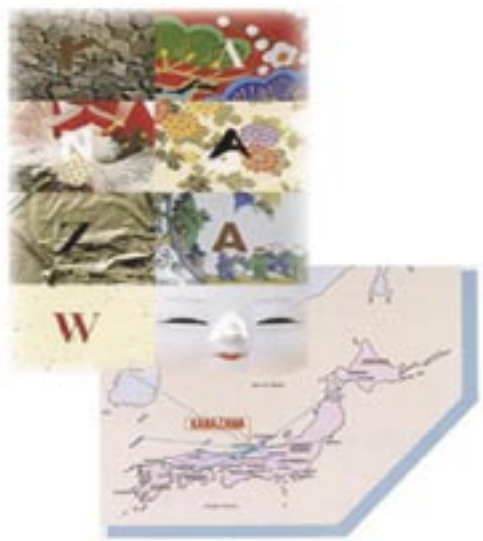
The 28th International Conference on Lightning Protection, ICLP 2006, Kanazawa provides an excellent opportunity for scientists, engineers, designers and users of lightning protection systems, from a wide range of universities and industrial companies, to present and discuss the latest scientific results and share their practical experience in the field of lightning protection technology.

Venue:

The 28th International Conference on Lightning Protection will be held at the Ishikawa Ongakudo and the Hotel Nikko Kanazawa during September 18 - 22, 2006. The site is located at a very convenient place, just in front of the JR (Japan Railway) Kanazawa station. Ishikawa Ongakudo is a concert hall built in 2001, and is opened to public for operas, concerts and Japanese cultural performances, such as Kabuki play, traditional dance, Noh play and Kyogen play. ICLP 2006 Opening Ceremony will be held at Hogaku-do Hall on the 18th, September and Technical Exhibition and Poster Session will be held at Koryu Hall (multi purpose hall for the meetings) during the conference. Oral Sessions will be held at the 2 rooms of the Hotel Nikko Kanazawa, located close to the Ishikawa Ongakudo.

Kanazawa and its history:

Kanazawa is one of Japan's foremost castle towns. The city boasts many places of historic and aesthetic interest, such as the splendid Kenrokuen, known as one of the three most beautiful gardens in Japan, and Ishikawa-mon, the commanding gate to the old castle grounds.



In Kanazawa, one is acutely aware of the changing seasons. Not only is Kanazawa's natural scenery a colorful delight year-round, but every seasonal change is so carefully celebrated in Kanazawa's traditional cuisine, decor and yearly events that one comes to feel as if there are many more than four seasons.

Geographically, Kanazawa's central location makes it an ideal base for exploring the Hokuriku region as a whole. Ishikawa's charming Noto Peninsula and Kaga region, as well as neighboring Toyama, Fukui and Gifu prefectures, are all easily accessible from Kanazawa.

Kanazawa's history began in 1546, when the Buddhist Ikko sect set up a religious government centered on a temple, which later became the site of Kanazawa Castle. The Buddhists' power grew, and so did Kanazawa. Kanazawa was invaded in 1580, and following a turbulent period, was finally taken over by Maeda Toshiie, a retainer of Oda Nobunaga, in 1583. When Japan came under the control of the Shogun Tokugawa leyasu in 1603, Maeda's vast territorial holdings were recognized, making Kaga the wealthiest province in Japan. Its wealth, measured by its rice yield, was one million koku, or five million bushels, Hence, the elegant and refined culture that developed in Kanazawa under Maeda's patronage is referred to as Kaga Hyakumangoku. In 1871, when the feudal provinces were abolished and modern prefectures established, the Kaga region was the third most populous in Japan after Tokyo and Osaka. Since Maeda Toshiie's entrance into Kanazawa in 1583, the city has been completely untouched by war and thus retains much of its historic beauty. While preserving its precious heritage, Kanazawa has developed into a thoroughly charming modern city. Also there are so many spots to see during the conference and after conference. Visit http://www.city.kanazawa.ishikawa.jp/index_e.html

Access:

Kanazawa is locating at north east of center Japan. There is one airport (Komatsu International Airport), and it is accessible for the travelers from foreign countries via Narita International Airport, Inchon airport of Korea, or Shanghai airport of China.

* Komatsu International Airport

- 11 flights daily from Haneda International airport (50 minutes)
- 1 flight daily from Narita International Airport
- 4 flights weekly from Seoul
- 2 flights weekly from Shanghai
- Approximately 45 minute drive from Komatsu airport to Kanazawa city by metro express bus

By Express Train (Japan Railway) from Tokyo, Kyoto or Osaka

- Approximately 3.5 hours from Tokyo and 3.5 hours from Osaka
- The Tokaido Shinkansen runs frequently every 5 minutes between Tokyo and Osaka, stopping at Nagoya and Kyoto.
- The Joetsu Shinkansen runs frequently every 20 minutes between Tokyo and Niigata. (Note: Not all trains stop at Echigoyuzawa Station.)
- From Kyoto or Osaka to Kanazawa: The Limited Express frequently runs about every 30 minutes.
- From Echigoyuzawa or Nagaoka to Kanazawa: The Limited Express runs frequently at least about every 1 hour.
- Approximately it takes 3.5 hours from Tokyo via the Joetsu Shinkansen; from Kyoto by Limited Express it takes 2.5 hours; from Osaka by Limited Express it takes 3 hours.
- The conference place (Ishikawa Ongakudo) is located against JR Kanazawa Station.

See the next URL for getting train timetable.
JR East HP: http://www.jreast.co.jp/e/index.html (English)
JR Central HP: http://www.jr-central.co.jp/eng.nsf (English)
JR West HP: http://www.westjr.co.jp/ (Japanese)

Currency:

The official currency in Japan is Japanese yen (¥), however, most foreign currencies and travelers' checks are easily exchanged at banks and hotels. A passport may be required for currency exchange services.

- The Hokkoku Bank: (In front of JR Kanazawa Station, US Dollars, Euro, UK Pound, Mon-Fri, 9:00-15:00, Tel: 076-263-3416)
- The Hokuriku Bank: (In front of JR Kanazawa Station, US Dollars only, Mon-Fri, 9:00-15:00, Tel: 076-261-8227)
- Hotel Nikko Kanazawa: (US Dollars, Euro, UK Pound, Tel: 076-234-1111)

Registration desk:

The ICLP 2006 registration desk is located in the "Koryu Hall" at the Ishikawa Ongakudo entrance. All attendees must register upon arrival and receive a badge in order to participate conference activities.
The registration desk opens in the following hours:

– Sunday, 17 September: 13:00 - 18:00
– Monday, 18 September: 8:15 - 17:00
– Tuesday, 19 September: 8:15 - 17:00
– Wednesday, 20 September: 8:15 - 13:00
– Thursday, 21 September: 8:15 - 13:00

Conference proceedings:

Each registrant will receive the conference proceedings in CD-ROM and printed version at the registration desk.

Papers:

293 papers have been accepted by the Scientific Committee of ICLP 2006. Contributions have been received from more than 35 countries. Papers will be presented and discussed either orally or in poster sessions. All orally presented papers shall be presented exclusively through a computer projector system. MS Power Point (version 2000) will be available. When you want to use another kinds of software, please contact the organizers well in advance. A PC will be available in each conference room.
Please note that, there is no overhead projector facility in the conference room. If you have any question, please contact the organizing committee.

Working language:

The working language of the conference is English and will be used for all printed matters.

Lunches:

Daily lunches are not provided by the conference; however, there are wide varieties of lunch facilities all within walking distance.
http://www.100bangai.co.jp/ (Japanese)

Changes of conference program:

The program of the conference will be subject to change. In the event of cancellations by registrants or other, no full refund of the registration fee can be made.

Technical exhibition:

A technical exhibition will be opened during the conference (September 18-21, 2006) at the Ishikawa Ongaku-do (Koryu Hall). The list of the exhibitors is as follows.

Exhibitors

COSMO SYSTEM Co., Inc.
http://www.cosmo-sys.co.jp/

Hokuriku Electric Power Company
http://www.rikuden.co.jp/

OTOWA ELECTRIC COMPANY
http://otowadenki.co.jp

Sankosha Corporation
http://www.sankosha.co.jp

Central Research Institute of Electric Power Industry
http://criepi.denken.or.jp/en/

Morinaga Electronic Co., Ltd.
http://www.alp-plp.co.jp/ (Japanese)

PHOENIX CONTACT K.K.
http://www.phoenixcontact.com/

SHODEN Co., Ltd.
http://www.sdn.co.jp

ACE LION INC.
http://www.acelion.co.jp (Japanese)

Denken Co., Ltd.
http://www.e-power.jp/

Hakusan Mfg. Co., Ltd.
http://www.hakusan-mfg.co.jp/

Hokkei Industries Co., Ltd.

HOKUDEN CO., LTD.
http://www.hokuden-earth.co.jp/ (Japanese)

Japan AE Power Systems Corporation
http://www.jaeps.com/eng/index.htm

MIKIMOTO CO., LTD.
http://www.mikimoto.com.my/

http://www.melos.co.jp/ (Japanese Only)

Murata Electric Works Co., Ltd.
http://www.muratadenki-lps.com/sub1.htm

Nichiyu Giken Kogyo Co., Ltd.
http://www.nichigi.com/

NIKKO ELECTRIC MFG. CO., LTD.
http://www.nikko-el.co.jp/

NIPPON RISK MANAGEMENT SYSTEM Co., Ltd.

NISSIN ELECTRIC CO., LTD.
http://nissin.jp/

NTT FACILITIES INC.
http://www.ntt-f.co.jp/ (Japanese)

Thomas & Betts Corporation
http://www.tnb.com

TOYO ELECTRIC CORPORATION
http://www.toyo-elec.co.jp (Japanese)

MTL Instruments K.K.
http://www.mtlsurgetechnologies.com/

To meet and interact together during the coffee break, and the poster sessions, refreshments and coffee or tea will be served in the exhibition area for attendees and exhibitors.

Scientific Committee of ICLP wishes to inform all the ICLP participants as well as the visitors to the exhibition that the displayed projects, including their aimed performance are solely the responsibility of the individual exhibitors and thus ICLP does not endorse these nor take any responsibilities for the functioning of the displayed products.

Liability:

The International Conference on Lightning Protection organizing committee shall not be liable for any loss, damage, expenditure or inconvenience caused as a result of alteration or cancellation of the conference program for any reason beyond its control. The organizers cannot be held responsible for accidents to ICLP 2006 participants for damages, or loss of their properties. Participants should therefore make their own insurance arrangements.

ICLP 2006 Welcome Reception (Welcome Cocktail)

Sunday, 17 September, 18:00 -20:00

Hotel Nikko Kanazawa

Welcome Cocktail will be held at Hotel Nikko Kanazawa, which also accommodates the conference rooms. Welcome Cocktail is open to all ICLP 2006 attendees and registered accompanying persons.

Visiting Tour of Kanazawa City

Wednesday, 20 September, 14:00 - 18:00

(Private chartered bus, attended by a bilingual tour guide.)

A half day historical Kanazawa city will be provided for attendees and registered guests for free.

- Ishikawa Ongaku-do, Kenroku-en Garden, Kanazawa Castle and Park, Higashi geisha district (traditional amusement area), Buke-Yashiki Dori (historical samurai residential district), Myoruji Temple (known as Ninjya Temple, non stop) etc.

**The places to visit are subject to change depending on traffic conditions.

ICLP 2006 Banquet

Wednesday, 20 September, 19:00 - 21:30

Hotel Nikko Kanazawa

The Banquet will be held at a banquet room of Hotel Nikko Kanazawa, the same venue as the Welcome Reception. Banquet is open to all ICLP 2006 registrants and registered accompanying persons. You will encounter variety of foods in Traditional Japanese and Continental style.

Technical Tour (Optional tour)

Friday, 22 September, 08:30 -17:30

The following technical tour will be planned for the ICLP 2006 attendants, presenters and registered accompanying persons. (Reservation required, ¥3,000 per person, lunch included)　*Venues and schedule subject to change.

- #1 Lightning observation facilities at Japan Self Defense Air Force, Komatsu Air Base, and sightseeing of Eiheiji Temple, Tojinbo and around Fukui prefecture area, en route.
- #2 Lightning test facilities at Hokuriku Electric Power Company and sightseeing of Eiheiji Temple, Tojinbo and around Fukui prefecture area, en route.

Accompanying Persons' Program

KANAZAWA EXPERIENCES

Monday (18 September) to Thursday (21 September), 09:00 -12:30 or 13:30 -17:00
(Please feel free to contact the tour desk which will be set beside the registration desk during September 18-21, 9:00AM-17:00PM)
For the benefit of conference guests, we are able to arrange impressive activities, as Kanazawa Experience Programs during the conference hours with nominal fees.
(If you want to make the reservation, please ask at the tour desk)
http://www.nsknet.or.jp/heartkcb/index.htm

Museum for Traditional Products and Craft

"Gold and Silver Leaf Craftwork Sakuda" (Golden leaf Application Factory)

Reservation required.
Ninety-nine percent of Japanese gold leaf is high quality leaf produced in Kanazawa. Here you can watch the process of making gold leaf of a thickness of only 0.001mm, and try your hand at gold leaf application.

(Reservation required, 09:30, 13:15 & 15:00, ¥500 per person)
http://www.kinpaku.co.jp
http://www.city.kanazawa.ishikawa.jp/bunho/kinpaku/ (Japanese)

"Kaga-Yuzen Traditional Industry Museum"

In the mid-Edo period (1603-1863), a famous silk-dyer from Kyoto named Miyazaki Yuzen brought the Yuzen technique to Kanazawa and combined it with the local kaga-zome, producing a new style as Kaga Yuzen.
Here you can experience everything related to Kaga-Yuzen: view exhibits, shop, watch hand-painting demonstrations, try your hand at stencil dying ¥1,050 per person. (09:00-17:00, close on Wednesday, admission ¥300 per person)
http://www.kagayuzen.or.jp/

"Omi-machi Market and Myoryu-ji Temple " (Ninja-dera)

Reservation required.
A central place for food shopping among Kanazawa residents (Kanazawa kitchen), this market consists of about 170 shops selling fresh fish, crabs, vegetables etc. There are also sushi bars and restaurants for lunch and dinner. Nicknamed Ninjya Temple, Myoru-ji temple has many contraptions such as hidden stairs and floor traps to defend against attacking enemies. (09:00-16:30, Myoryu-ji= ¥800 per person)
http://www.myouryuji.or.jp/

"Zen Meditation and Shojin-Ryori Cuisine Lunch"

Reservation required.
This temple, Daijo-ji, was founded about twelve hundred and fifty years ago. Sometimes Daijo-ji is called Ohkyo-ji. Ohkyo Maruyama was a famous artist in the Edo period about two hundred years ago.

"Sake brewing " Yachiya Breweries Company

Reservation required.
Tour a Sake Brewery with a history of 370 years, and enjoy sake tasting. (10:00, 11:00, 14:30 and 15:30, ¥2,000 per person 720ml bottle of freshly brewed pure sake to take home, reservation required.)

"Unique Art of Twisted Paper Decoration" (Mizuhiki hand craft)

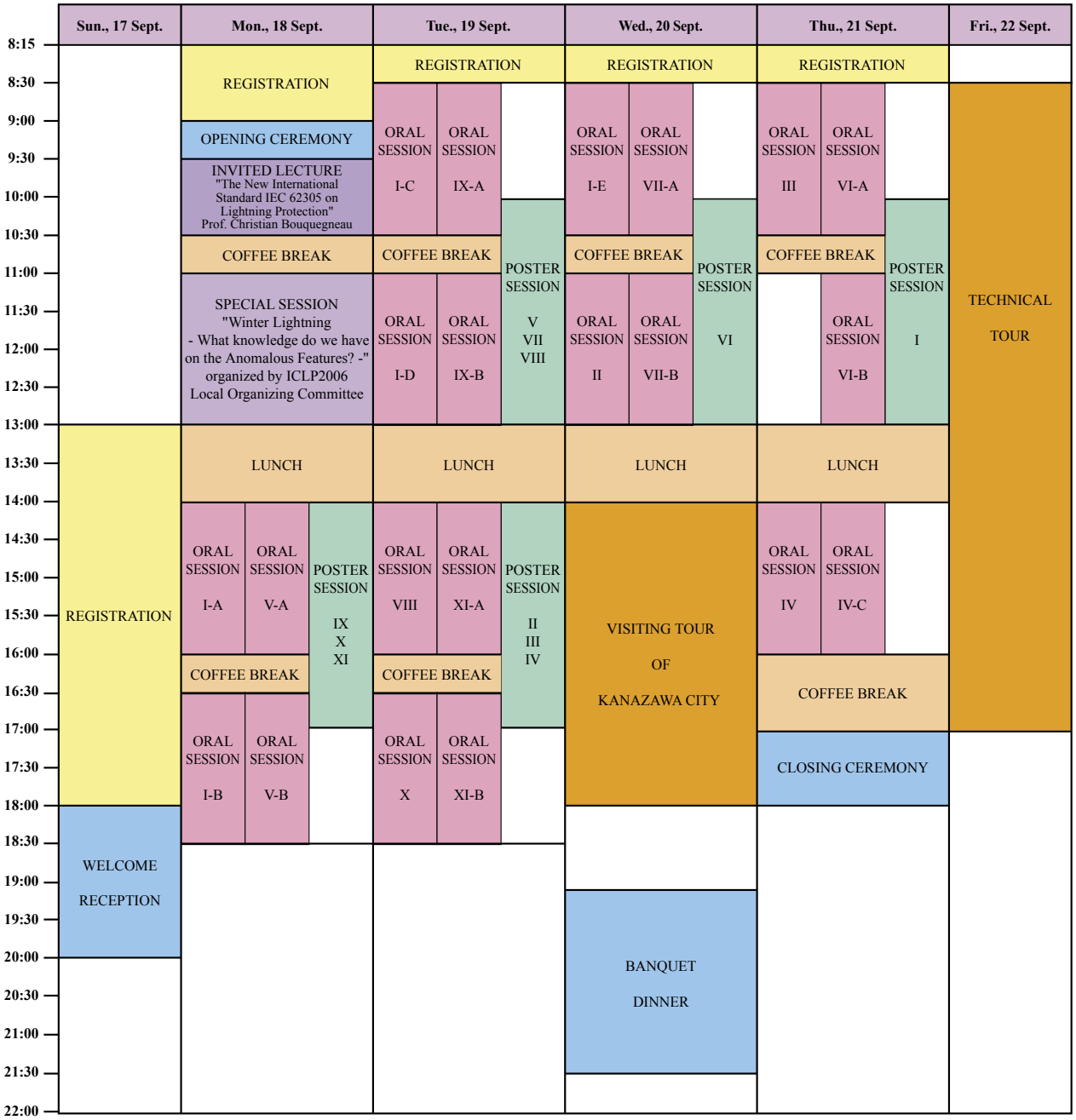
Reservation required.
Mizuhiki is high-quality Japanese paper cut into very long thin strips, stiffend with glue, and bent and tied into various symbolic shapes for occasions of celebration or mourning.

Ishikawa Gate, Kanazawa Castle

Buke-Yashiki Dori (historical samurai residential district)

Technical Program

TIME TABLE



Opening hour: (Registration desk)
Sunday, 17 September (13:00-18:00)
Monday, 18 September (8:15-17:00)
Tuesday, 19 September (8:15-17:00)
Wednesday, 20 September (8:15-13:00)
Thursday, 21 September (8:15-13:00)

Session site:

Opening session	- At Ishikawa Ongakudo (Hougaku Hall, 2F)
Oral session	- At Hotel Nikko Kanazawa (Kujaku Room A, C, 3F)
Poster session	- At Ishikawa Ongakudo (Koryu Hall, B1)
Closing Ceremony	- At Hotel Nikko Kanazawa (Kujaku Room B, C, 3F)

Opening Session

Ishikawa Ongaku-do (Hougaku Hall)

Monday, 18 September 9:00–9:30

Opening Ceremony:

Prof. Carlo Mazzetti, ICLP President
Prof. Shigeru Yokoyama, Chairman, ICLP2006 Local Organizing Committee
Regional Government Representatives

Monday, 18 September 9:30 - 10:30

Invited Lecture

INV-1 The Lightning Protection International Standard
Prof. Christian Bouquegneau
Chairman of IEC TC81 (Lightning Protection),
Pro-rector of the Faculté Polytechnique de Mons (Belgium)

Prof. Christian Bouquegneau (Belgium)

Monday, 18 September 11:00-13:00

Special Session

"Winter Lightning - What knowledge do we have on the Anomalous Features? -"
organized by ICLP2006 Local Organizing Committee
Chairman: Dr. Hideki Motoyama (Central Research Institute of Electric Power Industry (CRIEPI), Japan)

INV-2 Meteorological Aspects of Winter Thunderstorms along the Hokuriku Coast of Japan
Dr. Koichiro Michimoto (Japan Defense Agency, Japan)

INV-3 Observation of Current and Leader Development Characteristics of Winter Lightning
Dr. Megumu Miki (Central Research Institute of Electric Power Industry (CRIEPI), Japan)

INV-4 Electromagnetic Fields Associated with Lightning Discharges in Winter
Prof. Masaru Ishii (The University of Tokyo, Japan)

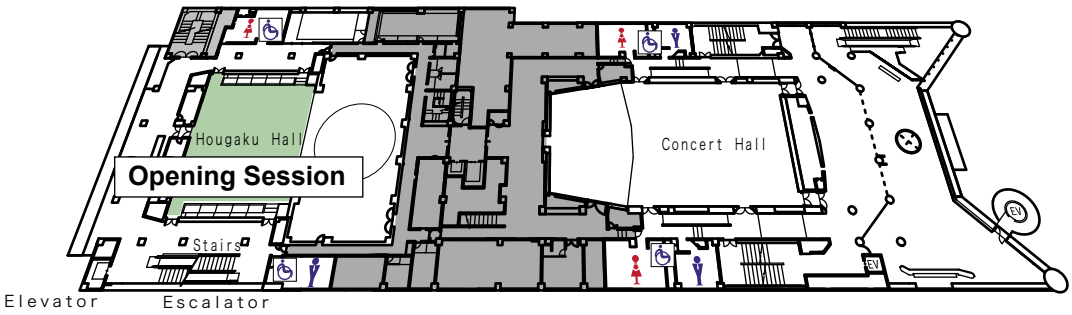
INV-5 Lightning Protection against Winter Lightning
Dr. Hitoshi Sugimoto (Hokuriku Electric Power Company, Japan)

Map and Ishikawa Ongakudo & Hotel Nikko Kanazawa

Ishikawa Ongaku-do

Building Guide

2F



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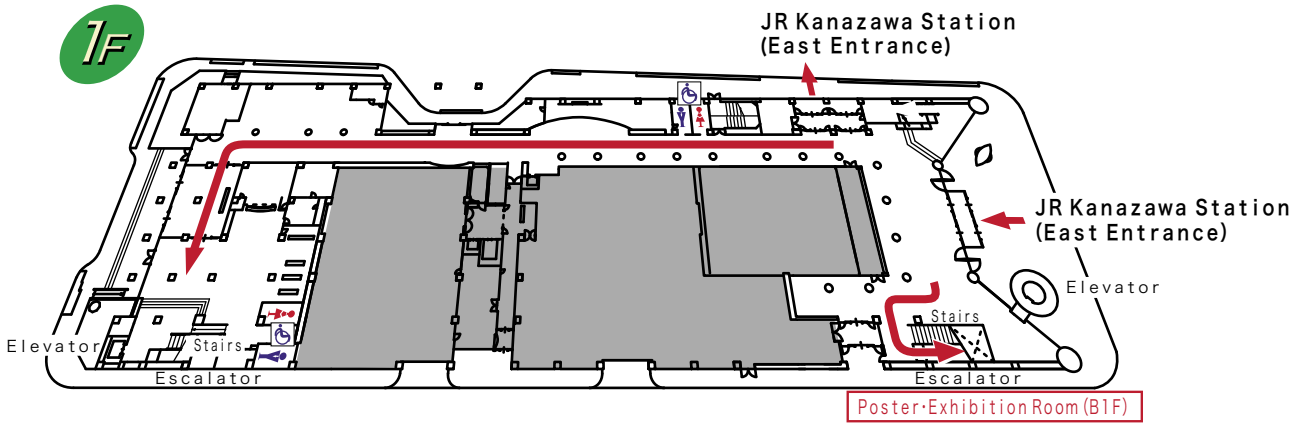

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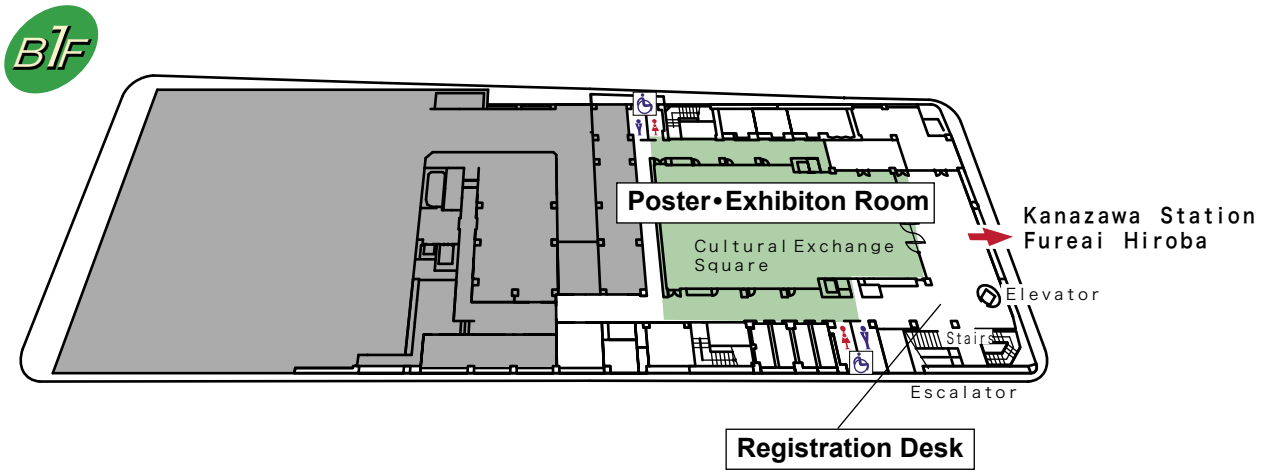
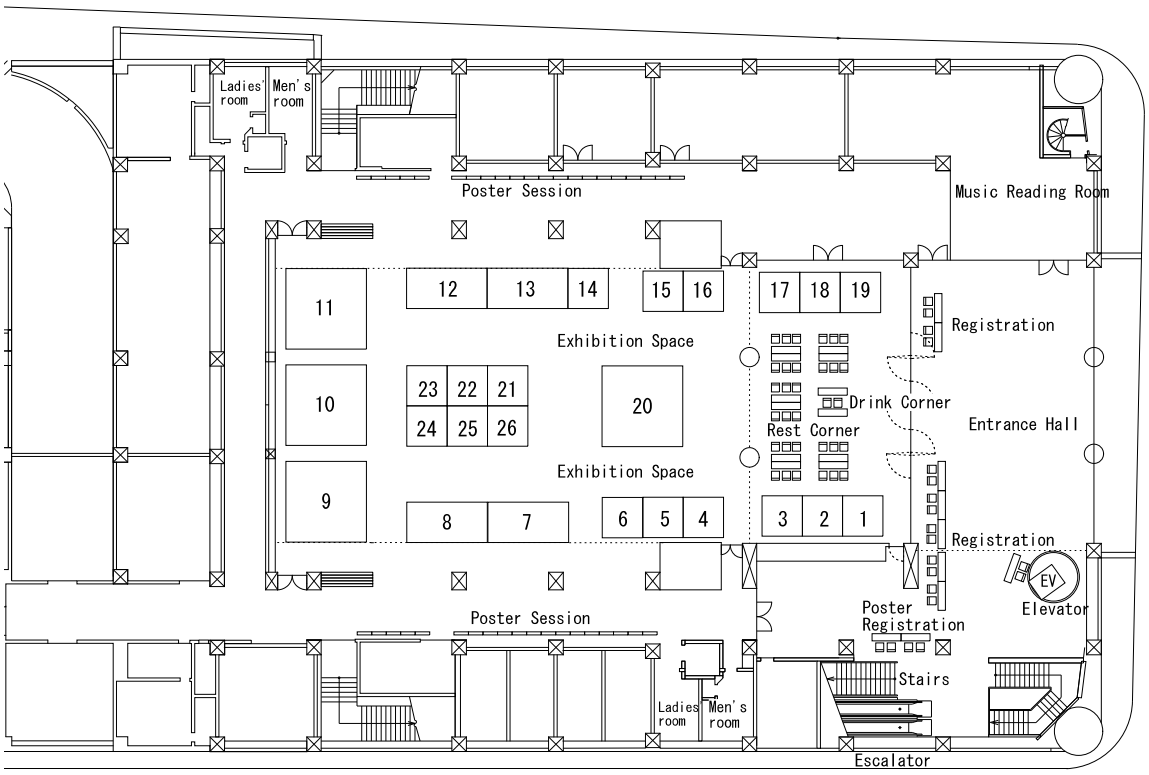


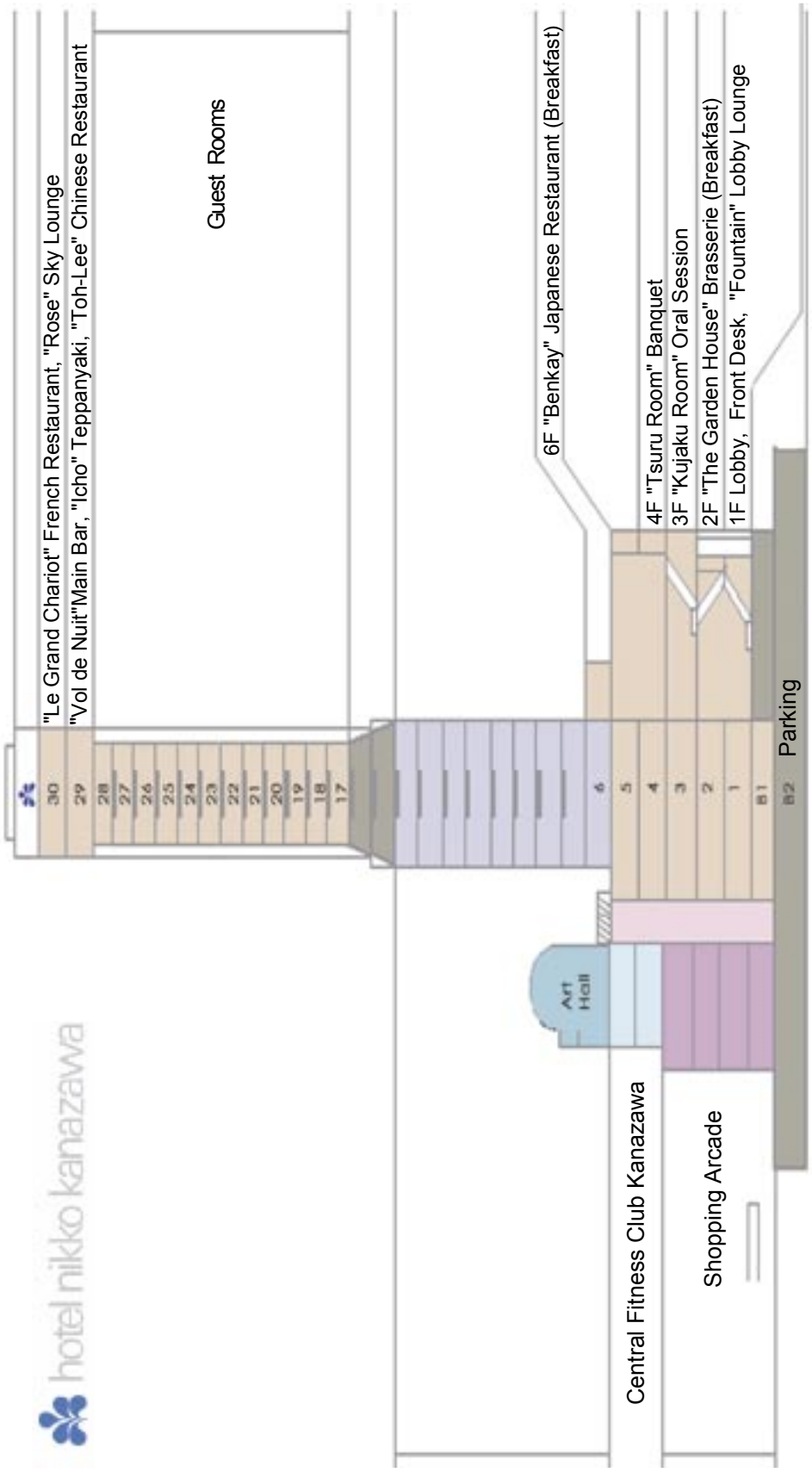
Booth Layout



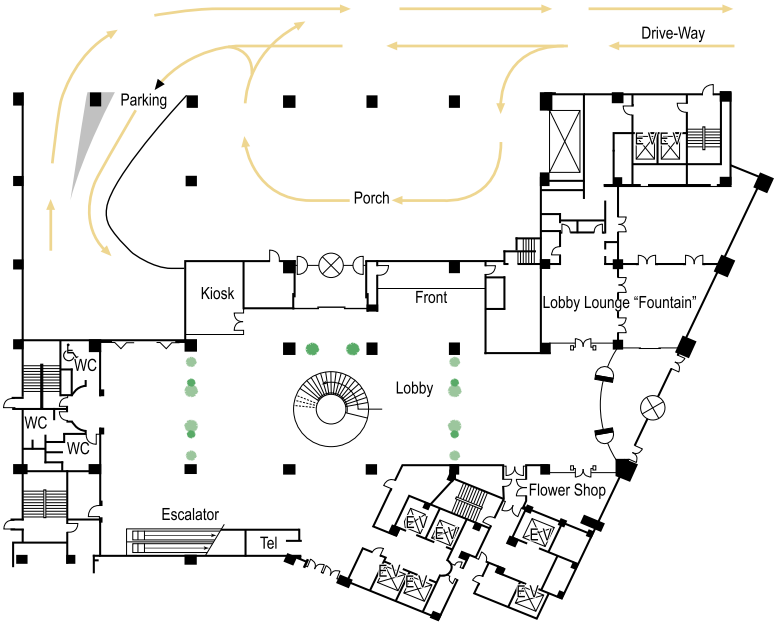
B1F Culture Exchange Square

1	NIKKO ELECTRIC MFG. CO., LTD.
2	TOYO ELECTRIC CORPORATION
3	ACE LION INC.
4	MIKIMOTO CO., LTD.
5	NIPPON RISK MANAGEMENT SYSTEM Co., Ltd.
6	Denken Co., Ltd.
7	Central Research Institute of Electric Power Industry
8	Morinaga Electronic Co., Ltd.
9	Sankosha Corporation
10	OTOWA ELECTRIC COMPANY
11	COSMO SYSTEM Co., Inc.
12	SHODEN Co., Ltd.
13	PHOENIX CONTACT K.K.
14	MTL Instruments K.K.
15	HOKUDEN CO., LTD.
16	Nichiyu Giken Kogyo Co., Ltd.
17	Hokkei Industries Co., Ltd.
18	NTT FACILITIES INC.
19	Japan AE Power Systems Corporation
20	Hokuriku Electric Power Company
21	Thomas & Betts Corporation
22	MITSUBISHI ELECTRIC LOGISTICS SUPPORT Co., Ltd.
23	NISSIN ELECTRIC CO., LTD.
24	Hakusan Mfg. Co., Ltd.
25	Murata Electric Works Co., Ltd.
26	K.K. PHOTONIX

Hotel Nikko Kanazawa


"Le Grand Chariot" French Restaurant, "Rose" Sky Lounge
"Vol de Nuit"Main Bar, "Icho" Teppanyaki, "Toh-Lee" Chinese Restaurant
Guest Rooms
6F "Benkay" Japanese Restaurant (Breakfast)
4F "Tsuru Room" Banquet
3F "Kujaku Room" Oral Session
2F "The Garden House" Brasserie (Breakfast)
1F Lobby, Front Desk, "Fountain" Lobby Lounge
Parking
Art Hall
Central Fitness Club Kanazawa
Shopping Arcade
hotel nikko kanazawa

1F


Drive-Way
Parking
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Front
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WC
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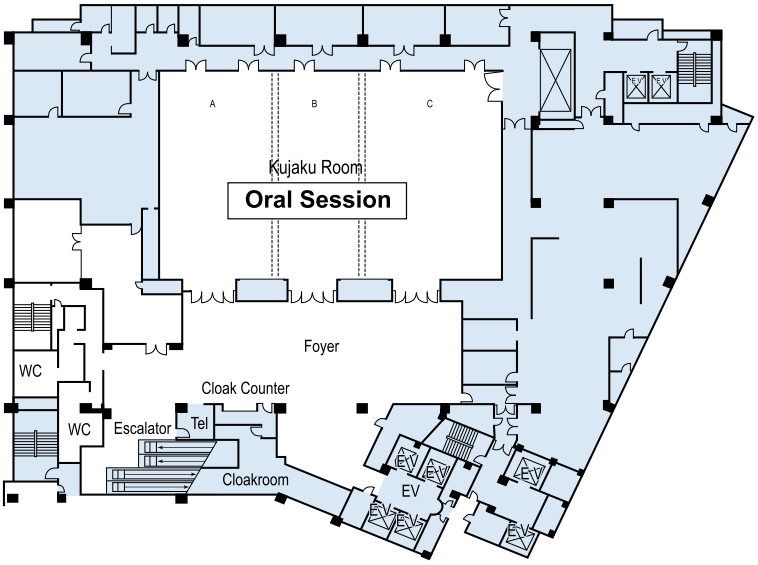
WC
Lobby
Flower Shop
Escalator
Tel
EV

3F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Kujaku Room
Oral Session
Foyer
WC
WC
Cloak Counter
Escalator
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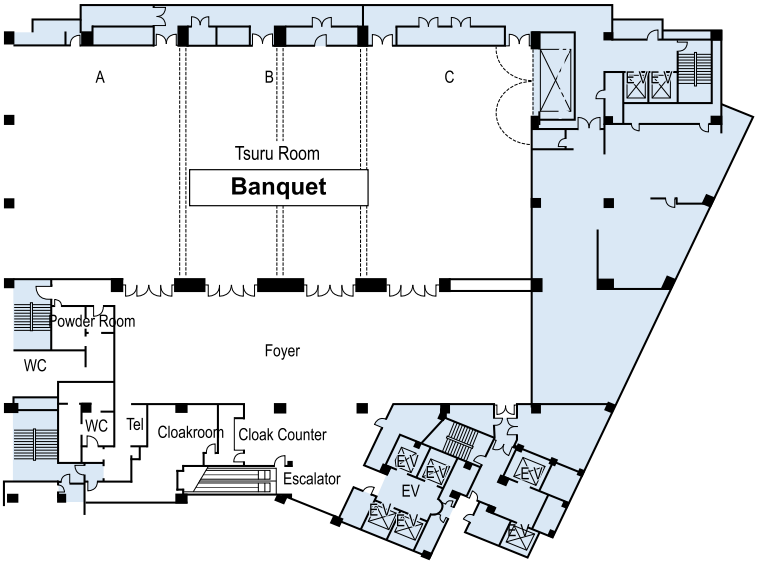
Cloakroom
EV

4F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Powder Room
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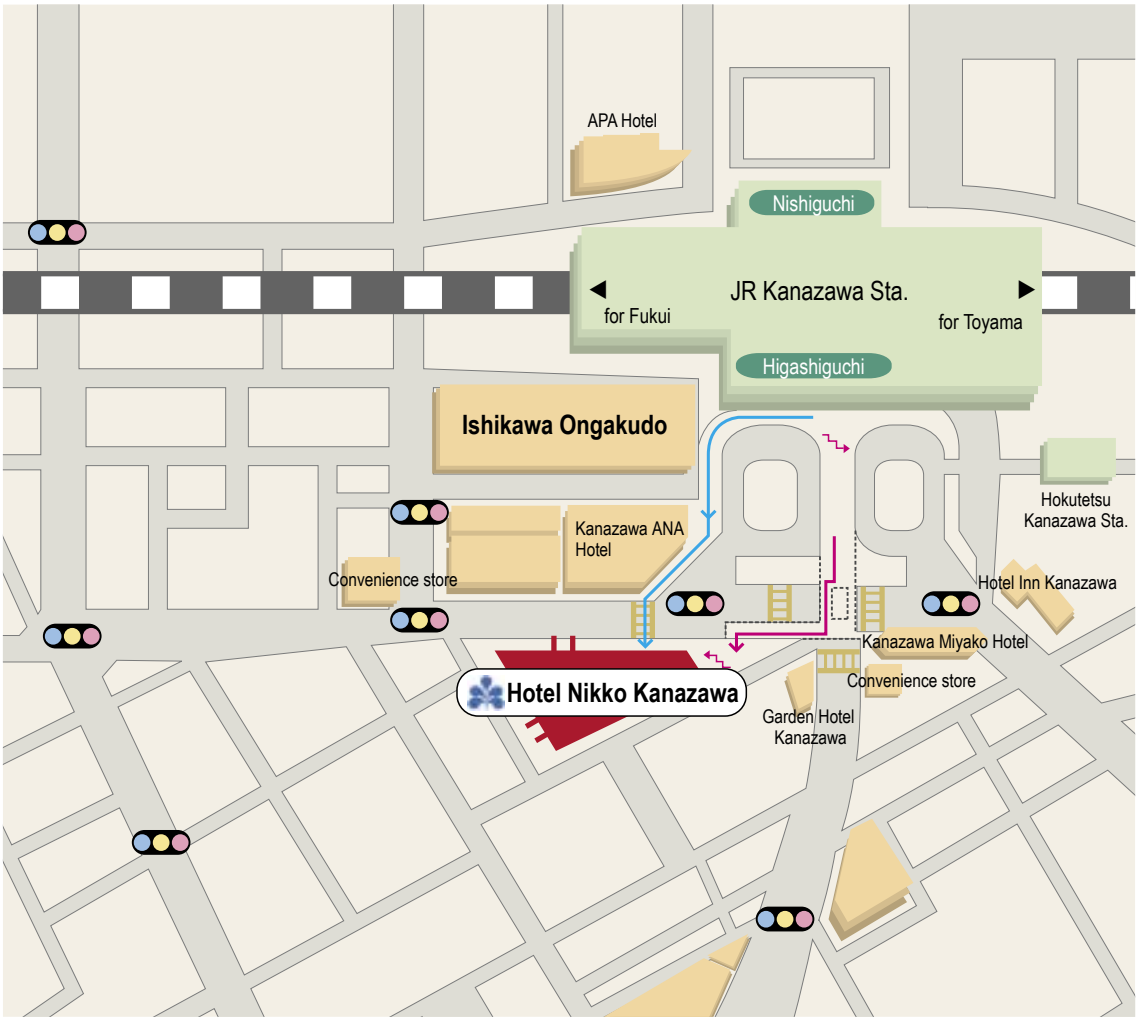
Cloakroom
Cloak Counter
Escalator
EV

Map


APA Hotel
Nishiguchi
JR Kanazawa Sta.
for Fukui
for Toyama
Higashiguchi
Ishikawa Ongakudo
Hokutetsu
Kanazawa Sta.
Kanazawa ANA
Hotel
Convenience store
Hotel Inn Kanazawa
Kanazawa Miyako Hotel
Convenience store
Hotel Nikko Kanazawa
Garden Hotel
Kanazawa

Technical Program

Topic I: Lightning Discharge

Session I-A: General Characteristics

Monday, 18 September *14:00-16:00*

Chairman: S. Visacro F. (Federal University of Minas Gerais, Brazil)
Moderator: A. M. Hussein (Ryerson University, Canada)

I-1 The Cloud-To-Ground Flash with Multiple Terminations on The Ground
X. Kong, X. Qie, G. Zhang, T. Zhang (P. R. China)

I-2 Positive Bipolar Type Radiation Field from Lightning in Sri Lanka
S. R. Sharma, M. Fernando, V. Cooray (Sweden)

I-3 Review of The Experiment of Triggered Lightning by Rocket in Japan
K. Horii, K. Nakamura, S. Sumi (Japan)

I-4 Electric Current and Electric Field Changes at Close Distances During Artificially Triggered Lightning Discharges
X. Qie, Q. Zhang, Y. Zhou, T. Zhang, X. Kong, G. Feng, J. Yang (P. R. China)

I-5 Energy of 2-27 kA Rocket-Triggered Winter Lightning in Hokuriku, Japan
T. Iwao, S. Kusunoki, T. Inaba, S. Sumi, M. Yoda, K. Nakamura (Japan)

I-6 Investigation of Peculiarities of The Spark Discharge Appearance in Artificial Cloud of Charged Water Aerosol
A. G. Temnikov, A. V. Orlov, V. N. Bolotov, Y. V. Tkach (Russia)

I-7 Study of Lightning Current Waveform Based on Observed Electromagnetic Field in Hokuriku Area
N. Itamoto, K. Shinjo, M. Saito, M. Ishii (Japan)

Session I-B: Lightning to Tall Structures

Monday, 18 September *16:30-18:30*

Chairman: S. Visacro F. (Federal University of Minas Gerais, Brazil)
Moderator: A. M. Hussein (Ryerson University, Canada)

I-8 Analysis of Lightning Current Measurement by Means of Resistive Transducers
A. N. Gomez, S. Visacro, J. L. Silvino, R. Hostt, L. C. Rocha (Brazil)

I-9 Characteristics of Positive Upward Lightning Measured on An Instrumented Tower
G. Diendorfer, H. Pichler, M. Mair (Austria)

I-10 Characterization of Current Pulses Superimposed on The Continuous Current in Upward Lightning Initiated From Tall Objects and in Rocket-Triggered Lightning
M. Miki, V. A. Rakov, M. A. Uman, F. Heidler, W. Zischank, G. Diendorfer, M. Mair, R. Thottappillil, D. Wang, T. Sindo (Japan)

I-11 Visual Characteristics of CN Tower Lightning Flashes
A. M. Hussein, F. Jabbar, W. Janischewskyj, M. Milewski, A. Abdelraziq (Canada)

I-12 CN Tower Lightning Snowstorm Characteristics
A. M. Hussein, M. Milewski (Canada)

I-13 Simultaneous Measurements of Return Stroke Current, Electric and Magnetic Fields at Three Distance Ranges Associated with Lightning Strikes to The CN Tower
D. Pavanello, F. Rachidi, W. Janischewskyj, M. Rubinstein, A. M. Hussein, E. Petrache, V. Shostak, C. A. Nucci, J. S. Chang, I. Boew, W. A. Chisholm, M. Nyffeler (Switzerland)

I-14 Summary of Winter Lightning at Maki in The Japan Sea Coastal Area
Y. Goto, K. Narita (Japan)

Session I-C: Meteorology and Global Phenomena

Tuesday, 19 September *8:30-10:30*

Chairman: E. P. Krider (The University of Arizona, USA) (nonattendance)
Moderator: M. Bernardi (CESI, Italy) (nonattendance)

I-15 The Lightning Observation by LDAR II Network in The Summer and Winter
M. Tatsumi, T. Idogawa, N. Honma (Japan)

I-16 An Operational VHF Broadband Digital Interferometer and Winter Thunderstorm Observations
T. Morimoto, M. Akita, T. Ushio, Z. Kawasaki (Japan)

I-17 Signatures of The Lightning HF Radiations at 10 MHz, 5 MHz and 3 MHz Associated with Leader and Return Stroke Process
M. Edirisinghe, J. S. Makela, R. Montano, M. Fernando, V. Cooray (Sri Lanka)

I-18 Characteristics of Winter Thunderclouds and Possibility of Nowcasting Using A Doppler Radar
F. Kobayashi, T. Shimura, H. Kawamoto, A. Wada, K. Shinjo (Japan)

I-19 Characteristics of ELF Transients for The Study of Huge Lightning in The World
K. Yamashita, T. Otsuyama, N. Sekiguchi, Y. Matsudo, Y. Ando, M. Hayakawa, K. Michimoto (Japan)

I-20 Lightning Activity Observed by TRMM Satellite
T. Morimoto, Z. Kawasaki, T. Ushio, S. Oita (Japan)

I-21 Characteristics of Sprites and Elves Associated with Japanese Winter Lightning, as Estimated by ELF Transients
Y. Matsudo, T. Suzuki, K. Yamashita, Y. Ando, M. Hayakawa, K. Michimoto (Japan)

Session I-D: Modeling

Tuesday, 19 September *11:00-13:00*

Chairman: V. A. Rakov (University of Florida, USA)
Moderator: T. Shindo (Central Research Institute of Electric Power Industry (CRIEPI), Japan)

I-22 Lightning Leader Channel Modeling
M. Vargas, V. Cooray, M. Becerra, H. Torres (Colombia)

I-23 Computer Simulation of Lightning Strokes
V. P. Charalambakos, D. P. Agoris, E. C. Pyrgioti, C. P. Stamatelatos (Greece)

I-24 Reproducing Lightning Electromagnetic Field Signatures with A New Current Return-Stroke Model Based on A Distributed-Circuit Approach
A. De Conti, S. Visacro (Brazil)

I-25 New Insights into Dynamics and Properties of The Lightning-Channel Corona Sheath
G. Maslowski, V. A. Rakov (Poland)

I-26 On The Need to Include Ground Reflections in Lightning Return Stroke Models of Current Generation Type
V. Cooray, V. Rakov (Sweden)

I-27 Reverse Discharges Near Grounded Objects During The Return Stroke of Branched Lightning Flashes
N. L. Aleksandrov, E. M. Bazelyan, R. B. Carpenter, Jr. , Y. P. Raizer (Russia)

I-28 Chemically Non-Equilibrium Model of Pulsed Arc Discharges in Air at Atmospheric Pressure
Y. Tanaka, T. Michishita, Y. Uesugi (Japan)

Session I-E: Observation Techniques

Wednesday, 20 September *8:30-10:30*

Chairman: *V. A. Rakov (University of Florida, USA)*
Moderator: *T. Shindo (Central Research Institute of Electric Power Industry (CRIEPI), Japan)*

I-29 Measuring System Specially Designed for Lightning Electromagnetic Fields
M. Rubinstein, D. Pavanello, V. Muehauser, F. Rachidi, J. L. Bermudez, D. Bommottet, P. Favre, F. Baumgartner, E. Montandon (Switzerland)

I-30 Measurements of Two Orthogonal Components of Electric Field Based on Second Harmonic Generation in Nonlinear Electro-Optic Crystal
R. Tanaka, N. J. Vasa, S. Yokoyama (Japan)

I-31 Investigation of The Applicability of An Anisotropic Magnetoresistive Sensor to Lightning Flash Observation
Y. Kishimoto, M. Ohba, H. Satoh (Japan)

I-32 Estimation of Lightning Currents from Measurements Performed on Elevated Objects
A. Piantini, M. Shigihara (Brazil)

I-33 Estimation of Lightning Current Parameters Based on Measurement of Electric Field Waveforms
T. Harada, K. Michishita (Japan)

I-34 Study of The Estimation of The Amount of Lightning Electric Charge by Measurement of The Electric Field
F. Suzuki, M. Shimizu, R. Iwashita, N. J. Vasa, S. Yokoyama (Japan)

I-35 Measurement and Estimation of Charge Transfer in Lightning Discharge Using ELF Transient
T. Otsuyama, M. Sekiguchi, M. Hayakawa (Japan)

Session I-P: Poster Session

Thursday, 21 September *10:00-13:00*

I-36 Characteristics of Lightning Discharges and Charge Structure of Thunderstorms in Tibet Plateau
Y. Zhang, W. Dong, Q. Meng, W. Lu (P. R. China)

I-37 Characterization of The Lightning Occurred in Lhasa City, Tibet Plateau Region of China
D. Wang, K. Minamitani, H. Horibe, N. Takagi, T. Watanabe, Y. Tie, X. Qie, Y. Zhang, D. Sang (Japan)

I-38 The Characteristics of Lightning and Thunderstorm on The Central Tibetan Plateau
T. Zhang, X. Qie, J. Yang, X. Kong (P. R. China)

I-39 Characteristics of Cloud Flashes Inferred From Measurements of Electric Fields Over Sri Lanka A Tropical Country
J. Bodhika, M. Fernando, V. Cooray (Sri Lanka)

I-40 Comparison Between The Signatures of Lightning Electric Field Measured in Colombia and That in Sri Lanka
F. Santamaria, F. Roman, C. Gomes (Sri Lanka)

I-41 Common Features of Return Stroke Optical Traveling Waves and Their Interpretations
D. Wang, V. A. Rakov, N. Takagi, T. Watanabe (Japan)

I-42 Modelling of The CN Tower Lightning Return-Stroke Current Derivative
K. Bitner, A. M. Hussein (Canada)

I-43 On The Effect of The Finite Ground Conductivity on Electromagnetic Field Radiated by Lightning to Tall Towers
V. Cooray, G. Diendorfer, C. A. Nucci, D. Pavanello, F. Rachidi, M. Becerra, M. Rubinstein, W. Schulz (Switzerland)

I-44 Effect of Traveling-Waves of Current on The Electromagnetic Response of A Tall Franklin Rod Considering Various Lightning Return Stroke Models
E. P. Krider, S. Guerrieri, F. Napolitano, C. A. Nucci, M. Paolone, F. Rachidi, V. A. Rakov (Italy)

I-45 Travelling Wave Phenomena in Numerical Analyses of Direct Lightning Stroke to A Communication Tower
R. Markowska (Poland)

I-46 First Steps on The "Eagle Nest" Instrumented Tower in Spain
J. Montanyà, D. Romero, N. Pineda, J. R. Hermoso, G. Solà, D. Martínez (Spain)

I-47 Development of A Zone Based Thunderstorm Classification System Using Neural Network
J. Singye, K. Masugata, T. Murai, I. Kitamura (Japan)

I-48 Relationship Between Thunderstorm Echoes and Lightning Discharges.
T. Suzuki, T. Miyazaki, M. Hayakawa, K. Michimoto, Y. Ohhigashi (Japan)

I-49 Winter Sprites and Associated Phenomena in The Hokuriku Area, Japan
M. Hayakawa, T. Nakamura, Y. Matsudo, K. Yamashita, D. Iudine, T. Suzuki, K. Michimoto (Japan)

I-50 Details of Lightning Channels Associated with Sprites in Winter Around The Hokuriku Coast.
T. Suzuki, Y. Matsudo, M. Hayakawa, K. Michimoto, T. Shimura, T. Hanada (Japan)

I-51 Chaotic Nature Research of Induction Field Fluctuation by Lightning Discharge
T. Miyazaki, T. Okada, T. Suzuki (Japan)

I-52 Evidence on A Link Between The Intensity of Schumann Resonance and Global Surface Temperature
M. Sekiguchi, M. Hayakawa, A. P. Nickolaenko, E. Williams, Y. Hobara (Japan)

I-53 Lightning Discharge Mapping System Using Time Differences of The Broadband Arrival Pulses Technique
T. Tantisattayakul, K. Masugata, I. Kitamura, H. Shimaki, T. Kawauchi, H. Kawamura, H. Ito (Japan)

I-54 Lightning HF Radiation at 10 MHz During Dart Leader and Subsequent Return Stroke Processes
J. Makela, M. Edirisinghe, M. Fernando, R. Montano, V. Cooray (Finland)

I-55 The Lightning HF Radiation at 10 MHz, 5 MHz and 3 MHz Associated with Cloud Flashes
V. Jeyanthiran, M. Edirisinghe, M. Fernando, V. Cooray (Sri Lanka)

I-56 An Algorithm Using The Prior Information for Estimation of Thundercloud Electric Charge Distribution
K. Honda, A. Miyabayashi, Y. Horita, T. Murai (Japan)

I-57 On The Electric Field at The Tip of Dart Leaders in Lightning Flashes
V. Cooray, M. Becerra, V. Rakov (Sweden)

I-58 Evaluations of Thundercloud Structure and Lightning Progression Process by Electric Field Observations
K. Masugata, T. Yoshioka, Y. Hasegawa, T. Thanapol, I. Kitamura, H. Ito, H. Kawamura, S. Yokoyama (Japan)

I-59 A Current Generation Type Return Stroke Model That Predicts The Return Stroke Velocity
V. Cooray, V. Rakov (Sweden)

I-60 Radiated Lightning Electromagnetic Fields at Different Heights Above Ground
J. T. Meledath, S. K. Nayak (India)

I-61 Visualization of Neutral Density Variations Accompanying Impulse Discharges in Air
T. Fukuchi, K. Nemoto (Japan)

I-62 Design and Implementation of The Electro-Optic Sensor for Lightning Electric Field Measurement
R. Zeng, W. Chen, X. Liang, J. He (P. R. China)

I-63 Simple Technique for Detection of HF Radiation From Lightning
J. Makela, J. Jantunen, T. Ahola, A. Hamalainen , R. Montano, V. Cooray (Finland)

I-64 Experimental Analysis of A Parallel Plate Antenna Used in Lightning Electric Field Measurements
F. Santamaria, F. Vega, F. Roman (Colombia)

Topic II: Lightning Occurrence Characteristics

Session II: Lightning Occurrence Characteristics

Wednesday, 20 September *11:00-13:00*

Chairman: *G. Diendorfer (ALDIS, Austria)*
Moderator: *M. Loboda (Warsaw University of Technology, Poland)*

II-1 Lightning Characteristics in Japan: A 10-Year Study Using Data From The Lightning Location Systems of Electric Utilities
T. Suda, T. Shindo (Japan)

II-2 Total Lightning Mapping Using Both VHF Interferometry and Time of Arrival Techniques
J. Y. Lojou, K. L. Cummins (France)

II-3 Multiple Terminations of Lightning Ground Flashes Observed by LLS
M. Saito, M. Ishii, F. Fujii, A. Sugita (Japan)

II-4 Flash Multiplicity and Interstroke Intervals in Austria
W. Schulz, G. Diendorfer (Austria)

II-5 Lightning Location Systems: A Discussion About Flash and Stroke Density
R. N. Dias, C. R. De Mesquita, M. H. M. Vale, S. Visacro (Brazil)

II-6 Some General Thunderstorm Activity Data Obtained from The PERUN (SAFIR) System in Poland in Years 2002 - 2005
P. Baranski, W. Gajda, M. Loboda (Poland)

II-7 Detection of Winter Lightning by The Norwegian Lightning Location System
F. Dahlslett, A. Pleym, K. Solberg (Norway)

Session II-P: Poster Session

Tuesday, 19 September *14:00-17:00*

II-8 Differences of Lightning Characteristics Observed by Two Types Lightning Location Systems
K. Shinjo, H. Kawamura, N. Itamoto (Japan)

II-9 Lightning Characteristics in Japan Observed by The JLDN From 2000 to 2004
A. Sugita, M. Matsui, M. Osada (Japan)

II-10 Experimental Evaluation of The Catalan Lightning Detection Network in Spain
J. Montanyà, V. March, N. Pineda, A. Illa, D. Romero (Spain)

II-11 Lightning Detection System with Sferics Observation at A Single Station
S. Yagitani, I. Nagano, M. Ozaki (Japan)

II-12 A Study of Winter Thunderstorms in The Hokuriku Coastal Area, Japan.
K. Michimoto, T. Suzuki, T. Hanada, T. Shimura (Japan)

II-13 Analysis of Lower Ionospheric Perturbations Induced by TLEs by Means of VLF Trimpi Observations
Y. Matsudo, M. Hayakawa (Japan)

II-14 Datum Extension of Meteorological Thunderstorm Days Fields Based on PC-CCA
S.-R. Luo, H. Wang (P. R. China)

Topic III: Lightning Electromagnetic Impulse (LEMP) and Lightning-Induced Effects

Session III: Lightning Electromagnetic Impulse (LEMP) and Lightning-Induced Effects

Thursday, 21 September *8:30-10:30*

Chairman: T. Kawamura (The University of Tokyo, Japan)
Moderator: A. Borghetti (University of Bologna, Italy)

III-1 The Influence of Attachment Point on Lightning Induced Voltage
F. H. Silveira, S. Visacro, A. Soares Jr. (Brazil)

III-2 Simulation of Induced Voltages on An Aerial Wire Due to A Current Through A Buried Bare Wire Using The FDTD Method
A. Tatematsu, T. Noda, H. Motoyama (Japan)

III-3 Accuracy and Applications of Time-Domain Numerical Electromagnetic Code to Lightning Surge Analysis
R. K. Pokharel, M. Ishii (Japan)

III-4 Comparison of Different Approaches for The Evaluation of Lightning-Induced Overvoltages in Light-Rail DC Traction Power Systems
F. Delfino, R. Procopio, M. Rossi, C. A. Nucci, F. Rachidi, A. Borghetti, M. Paolone (Italy)

III-5 Overvoltages on LV Networks Associated with Direct Strokes on The Primary Line
P. F. Obase, A. Piantini, A. G. Kanashiro (Brazil)

III-6 Lightning-Induced Overvoltages in Rural Isolated Neutral Low-Voltage Systems
H. K. Hoidalen (Norway)

III-7 Analysis of Lightning-Induced Surge at Protection Control Device in Substation
S. Tamura, Y. Shibuya (Japan)

Session III-P: Poster Session

Tuesday, 19 September *14:00-17:00*

III-8 FDTD Simulation of Lightning-Induced Voltages on An Overhead Wire Above Lossy Ground
K. Okazawa, Y. Oka, M. Shimazoe, Y. Baba, N. Nagaoka, A. Ametani (Japan)

III-9 Effectiveness of FFT-IFFT Transformation During Calculation of The Electrical Pulse Under Ground Surface
G. Maslowski, J. Bajorek, M. Gamracki (Poland)

III-10 Factors Influencing Lightning Induced Over-Voltage on Overhead Power Line: Case Study Tanzania Power Lines Setup
R. Clemence, J. Damas, M. Manyahi, N. Mvungi (Tanzania)

III-11 A Computational Tool to Study The Induced Voltages on A Rural Line Due to Nearby Lightning
A. N. De Souza, A. M. Oltremari, P. S. Silva, M. G. Zago (Brazil)

III-12 Lightning Induced Voltages on LV Distribution Lines
A. Piantini, A. S. Neto (Brazil)

III-13 Estimation of Sparkover Rate of Medium-Voltage Line Due to Indirect Lightning Hit
Y. Hongo, K. Michishita, M. Ishii (Japan)

III-14 Evaluation of Lightning Surge Current Characteristics Induced on The Aerial Subscriber's Cable at Telecommunications Center End in NTT
S. Kuramoto, S. Chikai, T. Suzuki, Y. Tada (Japan)

Topic IV: Lightning Attachment

Session IV: Lightning Attachment

Thursday, 21 September *14:00-16:00*

Chairman: T. Horvath (Technical University of Budapest, Hungary)
Moderator: V. Cooray (University of Uppsala, Sweden)

IV-1 Electric Field Shielding and Corona Discharge Current Characteristics Due to Space Charge Around Electrode
K. Nakamura, H. Sakurano (Japan)

IV-2 A Simulation for The Efficiency of The Lightning Protection System of The Rion - Antirion Tall Bridge
V. P. Charalambakos, D. P. Agoris, C. P. Stamatelatos, E. C. Pyrgioti (Greece)

IV-3 Dynamic Modeling of The Lightning Upward Connecting Leader Inception
M. Becerra, V. Cooray (Sweden)

IV-4 Computation of Dependence of Lightning Rod Tip Radius on Installation Height Using Published Experimental Results
F. D'alessandro (Australia)

IV-5 Interception Efficiency of Lightning Air Termination Systems Constructed with Rolling Sphere Method
T. Horvath (Hungary)

IV-6 Consideration of Lightning Photograph Striking to Diet Building
Y. Shimosako, S. Yokoyama, N. J. Vasa (Japan)

IV-7 Numerical Simulation of Thunderstorm-Induced Discharge Processes Near Lightning Rods Installed on Grounded Structures
N. L. Aleksandrov, E. M. Bazelyan, F. D' Alessandro, Y. P. Raizer (Russia)

Session IV-P: Poster Session

Tuesday, 19 September *14:00-17:00*

IV-8 Influence of Space Charge on Upward Leader Initiation -In The Case of UHV Transmission Lines -
Y. Sunaga, T. Shindo (Japan)

IV-9 Electrical Discharge Triggered and Guided Using Ultrashort High-Intensity Laser
T. Fujii, M. Miki, N. Goto, T. Nayuki, T. Shindo, K. Nemoto (Japan)

IV-10 An Improved Upward Leader Propagation Model
M. Becerra, V. Cooray (Sweden)

IV-11 Behaviour of The Upward Leader Triggered by A Lightning Rod
A. Bedja, P. Auriol, F. Buret, O. Fulchiron, Y. Henaff, A. Rousseau (France)

IV-12 Effects of Corona Emission on Breakdown Voltage of Different Geometrical Air Terminal Tips.
M. L. Ong, H. Ahmad, A. Mui (Malaysia)

IV-13 Protection Efficiency of Lightning Rods Based on Monte-Carlo Method
R. Iwashita, Y. Shimosako, N. J. Vasa, S. Yokoyama (Japan)

IV-14 Attractive Radius of Elevated Building
S. Ait-amar, G. Berger (France)

IV-15 Striking Distance of Vulnerable Points to Be Struck by Lightning in Complex Structures
M. Becerra, V. Cooray, F. Roman (Sweden)

IV-16 Lightning Protection Under Consideration of Moving Arc.
J. Meppelink (Germany)

IV-17 Preliminary Investigation into Laser-High Voltage Interaction in The Case of The Streamer-To-Leader Process Using A High Power CO2 Laser
N. J. West, I. R. Jandrell, A. Forbes (South Africa)

Topic V: Lightning Downconductors and Earthing

Session V-A: Practical Problems

Monday, 18 September *14:00-16:00*

Chairman: C. Bouquegneau (The Faculté Polytechnique de Mons, Belgium)
Moderator: W. Hadrian (Vienna University of Technology, Austria)

V-1 Triggered-Lightning Testing of The Protective System of A Residential Building: 2004 and 2005 Results
B. A. Decarlo, V. A. Rakov, J. Jerauld, G. H. Schnetzer, J. Schoene, M. A. Uman, K. J. Rambo, V. Kodali, D. M. Jordan, G. Maxwell, S. Humeniuk, M. Morgan (USA)

V-2 Experimental Verifications on The Use of Natural Components of Structures as Part of A LPS
H. E. Sueta, G. F. Burani, D. M. Leite, J. A. B. Grimoni (Brazil)

V-3 Evaluation of Steelwork Continuity and Review of Utilizing Steelwork as A Down-Conductor in Reinforced Concrete Apartment Structures
K.-H. Lee, J.-B. Lee, S.-H. Chang (Korea)

V-4 Laboratory and Field Corrosion Tests of Earthing Rods for LPS (Lightning Protection Systems)
M. Lobota, R. Marciniak (Poland)

V-5 Overvoltage Protection of Large Power Transformers - A Real Life Study Case
C. L. Bak, K. E. Einarsdottir, E. Andresson, J. M. Rasmussen, W. Wiechowski, J. Lykkegaard (Denmark)

V-6 Retractile Grounding Cable Used for Floating Roof Tanks: Four-Year Experience
A. Galvan (Mexico)

V-7 Investigation of The Influence of Distribution Line Grounding Configurations on Lightning Overvoltages
F. S. Almeida, S. Visacro, J. C. S. Ventura, J. V. P. Duarte (Brazil)

Session V-B: Theoretical Problems

Monday, 18 September *16:30-18:30*

Chairman: C. Bouquegneau (The Faculté Polytechnique de Mons, Belgium)
Moderator: W. Hadrian (Vienna University of Technology, Austria)

V-8 Ground Resistance Versus Ground Impedance
A. J. Surtees, A. Rousseau, F. Martzloff (USA)

V-9 Counterpoise Impedance with Lightning Discharges. Critical, Effective, Minimal Impedance Lengths. Technical Considerations
B. Hermoso (Spain)

V-10 FDTD Simulation of A Horizontal Grounding Electrode and Its Equivalent Circuit Modeling
M. Tsumura, H. Yamamoto, Y. Baba, N. Nagaoka, A. Ametani (Japan)

V-11 Lightning Impulse Property of Vertical Grounding Rod
J. He, R. Zeng, Y. Li, B. Zhang, W. Zhuo, L. Wang, Y. Deng (P. R. China)

V-12 Development of Calculation Model for Grounding Resistance of Rod Electrodes Exposed to Large Lightning Impulse Current
Y. Asaoka, H. Motoyama, H. Matsubara (Japan)

V-13 PSpice Modelling of A Special Insulated Downconductor
F. D'alessandro, F. Alghusain (Australia)

V-14 Induced Magnetic Field Inside of Directly Stricken Building by Lightning
S. Miyazaki, M. Ishii (Japan)

Session V-P: Poster Session

Tuesday, 19 September *10:00-13:00*

V-15 Study on Simulation Model of Lightning Hit to Ground to Calculate Lightning Overvoltages in Residence
S. Sekioka, K. Mori, N. Fukazu (Japan)

V-16 Experimental Study on Transient Grounding Resistance of Vertical Electrodes
H. Motoyama (Japan)

V-17 Lightning Impulse Characteristics of Humus Soil
B. Zhang, J. He, B. Zhang, R. Zeng (P. R. China)

V-18 High Frequency Measurements of Grounding Impedance on Resistive Soils
P. Llovera, J. A. Lliso, A. Quijano, V. Fuster (Spain)

V-19 Evaluation of Lightning Protection Earthings by Their Frequency and Impulse Properties
S. Wojtas, A. Rousseau (Poland)

V-20 Quasi-Static Approximation of Concentrated Ground Electrodes: Experimental Results
D. Romero, J. Montanyà, J. Montañá, D. Garriga, V. March, R. Miranda (Spain)

V-21 Variation of Soil Resistivity and Ground Resistance During The Year
I. F. Gonos, A. X. Moronis, I. A. Stathopulos (Greece)

V-22 Study of Induced Electric Current in The Ground at The Lightning - Around The Seismic Fault Zone-
T. Tambo, H. Sakai, T. Nagao (Japan)

V-23 Study of Remanent Magnetization of Fulgurite
H. Sakai, K. Kumazaki (Japan)

V-24 Effects of Rain and Snow on Electromagnetic Field Radiation of Grounding Systems
S. A. Mosaddeghi, A. Shoory, S. H. H. Sadeghi, R. Moini (Iran)

V-25 Effective Length and Impedance of Grounding Electrode For High Frequency Current
H. Sakurano, A. Ohtsubo, M. Minowa, T. Takashima (Japan)

V-26 Keeping Seperation Distances by Use of Insulated Downconductors -Application and Experiences-
R. Brocke, P. Zahlmann (Germany)

Topic VI: Lightning Protection of Power Systems

Session VI-A: Lightning Performance of Distribution Lines

Thursday, 21 September *8:30-10:30*

Chairman: C. A. Nucci (University of Bologna, Italy)
Moderator: A. Piantini (University of São Paulo, Brazil)

VI-1 Fundamental Surge Propagation Characteristics of Overhead Distribution Line
S. Matsuura, T. Noda, A. Asakawa, S. Yokoyama (Japan)

VI-2 Analysis of Lightning Phenomena Observed in Distribution Lines
T. Hirai, T. Miyazaki, K. Aiba, S. Okabe (Japan)

VI-3 Insulation Coordination of MV Cables Against Lightning-Induced Overvoltages Generated by LEMP-Coupled Overhead Lines
A. Borghetti, M. Marzinotto, C. Mazzetti, C. A. Nucci, M. Paolone (Italy)

VI-4 Improvements to A Pole-Mounted Distribution Transformer Model for Electromagnetic Transient Studies and Validation by Field Tests
H. Honda, T. Noda, A. Asakawa, T. Shindo, S. Yokoyama (Japan)

VI-5 Estimation of Lightning-Caused Stresses in A MV Distribution Line Using A Three-Wire Approach
V. Shostak, W. Janischewskyj, F. Rachidi, A. M. Hussein, J. S. Chang, D. Pavanello, E. Petrache (Ukraine)

VI-6 Verification of A Composite Model of A Reinforced Concrete Pole and A Grounding Electrode
T. Miyazaki, K. Mori, K. Aiba, J. Yoshinaga, T. Hirai, S. Okabe, S. Sekioka (Japan)

VI-7 Experimental Study on Customer Indoor Overvoltage Due to Lightning Strike on The Joint Pole of Power Line and Telecommunication Line
M. Ikuta, A. Asakawa, S. Yokoyama, M. Soeda (Japan)

Session VI-B: Lightning Performance of Transmission Lines

Thursday, 21 September *11:00-13:00*

Chairman: S. Yokoyama (Central Research Institute of Electric Power Industry (CRIEPI)/ Kyushu University, Japan)
Moderator: V. Shostak (National Technical University of Ukraine "Kyiv Polytechnic Institute", Ukraine)

VI-8 Direct Lightning Strokes to Phase Conductors of UHV Transmission Lines
J. Takami, S. Okabe (Japan)

VI-9 Experimental Approach of The Lightning Protection Measures for Small-size OPGW
M. Shimizu, A. Matsumoto, Y. Goda (Japan)

VI-10 Sparkover Characteristics of Long Air Gaps with Negative Switching Impulse
S. Taniguchi, Y. Ichijyo, S. Okabe, A. Asakawa, M. Miki, T. Takahashi, T. Shindo (Japan)

VI-11 Discharge Characteristics of Long Parallel Electrode to Clarify Lightning Backflashover Phenomena Between The Ground Wire and Power Lines
S. Narita, O. Oguri, K. Nonaka, Y. Kinoshita, H. Motoyama, T. Shindo, I. Kishijima (Japan)

VI-12 Lightning Performance of Long Mixed Overhead-Cable EHV Lines
A. Geri, F. M. Gatta, S. Lauria, L. Colla (Italy)

VI-13 Study of Lightning Fault of Transmission Lines Using Nonlinear Grounding Resistance Model
M. Abe, K. Ikeda, T. Hara (Japan)

VI-14 Effect of Installation of Current-Limiting Arcing Horns to Prevent Interruptions Caused by Lightning Stroke
K. Watanabe, H. Fukushima, S. Ebinuma (Japan)

Session VI-C: Lightning Transients and Surge Arresters in Power System

Thursday, 21 September *14:00-16:00*

Chairman: H. Torres (National University of Colombia, Colombia)
Moderator: R. Thottappillil (Uppsala University, Sweden)

VI-15 Influence of Lightning Current Parameters for Over-Voltage Analysis on Transmission Line
M. Shimizu, H. Motoyama, S. Yokoyama (Japan)

VI-16 Observation of Lightning Strike Phenomena by The Ground Fault Finder (GF)
M. Watanabe, H. Yonei, M. Arakane, M. Shimizu (Japan)

VI-17 Evaluation of Fault Location Error Caused by Lightning of Highly Accurate Fault Locator System for Transmission Line
Y. Kubouchi, E. Tsukasaki, T. Sawada, M. Shimizu, A. Sakai (Japan)

VI-18 Effective Partial Installation of Line Surge Arresters for 275kV Transmission Lines in Winter Lightning Area
T. Araya, N. Tamura, K. Kumata (Japan)

VI-19 Evaluation of Surge Arresters for 66-500kV Substaions in Japan Under Social Conditions
S. Shirakawa, S. Nishimura, T. Kobayashi, H. Komatsubara, N. Sugiki, T. Akedani, D. Takayama (Japan)

VI-20 Coordinated Multi-Stage Surge Protective Systems Without Decoupling Elements
M. Wetter, J. Schimanski, K. Scheibe (Germany)

VI-21 Comparison of Wire Antenna and Transmission Line Model for Transient Analysis of Grounding Electrodes
D. Poljak, V. Doric, R. Lucic, S. Antonijevic, V. Murko (Croatia)

Session VI-P: Poster Session

Wednesday, 20 September *10:00-13:00*

VI-22 Effect of Overhead Ground Wire Positioning Under MV Lines Against Surge Arrester Failures
H. Sugimoto, H. Sugimoto, Y. Asaoka (Japan)

VI-23 Statistical Data of Lightning Surges in Real Distribution Lines
T. Miyazaki, K. Aiba, T. Hirai, S. Okabe (Japan)

VI-24 Lightning Performance on Overhead Distribution Lines: After Improvement Field Observation
R. Zoro, R. Mefiardhi, S. Hidayat, R. Mardiana (Indonesia)

VI-25 Case Study on Lightning Protection Effects of Power Distribution Lines with Overhead Ground Wires
R. Chiba, A. Asakawa, S. Yokoyama (Japan)

VI-26 Post Mounted Distribution Transformer Failures Due to Lightning Correlating to The Grounding Resistance
D. P. Agoris, E. C. Pyrgioti, S. Dragoumis (Greece)

VI-27 Lightning Surge Propagation Across Electric Power and Communication System in Residence
Y. Nagai, K. Kitamura, H. Fukuzono (Japan)

VI-28 Experimental Study of The Relation Between The Earth Systems at The Pole Installed Transformer and Lightning Overvoltages on Distribution Lines
A. Asakawa, R. Chiba, S. Yokoyama (Japan)

VI-29 The Testing for Verification of Lightning Protection System on iDC
A. Higano, E. Sudou, D. Imaoka, T. Kurama, K. Seki, T. Hashimoto (Japan)

VI-30 A Long Tail Waveform of Lightning Current Observed with A Transmission Line Fault
N. Kanao, K. Kami (Japan)

VI-31 Observation of Lightning Strike Phenomena on 500 kV Transmission Lines
M. Shono, M. Shimizu, A. Matsumoto (Japan)

VI-32 Effect of Fog on Lightning Shielding Characteristics
S. Taniguchi, Y. Ichijyo, S. Okabe, T. Takahashi, A. Asakawa, M. Miki, T. Shindo (Japan)

VI-33 Predicted and Observed Lightning Flashover Based on EHV Power Line Voltages
I. Miyachi, M. Yoda (Japan)

VI-34 Use of Line Surge Arresters to Improve Lightning Performance of A 275kV Line: A South African Pre-Engineering Case Study
L. P. Peter (South Africa)

VI-35 DC Arc Tests of OPGW Simulating High Energy Lightning Strike
Y. Goda, M. Shimizu, A. Matsumoto (Japan)

VI-36 Lightning Performances of Transmission Lines Based on Whole Transmission Line Model
Y. Li, J. He, R. Zeng, B. Zhang, W. Zhuo, L. Wang, Y. Deng (P. R. China)

VI-37 The Estimation of Lightning Outage Rates Using Geographical Region Information
Y.-W. Kang, H.-J. Kim, J.-S. Kwak, J.-W. Woo, D.-J. Kweon, E.-B. Shim (Korea)

VI-38 Calculation of Shielding Failure Rate of Transmission Lines with The Improved EGM and The Analysis on Typical Accident
W. Zhou , B. Ma, F. Xu, J. Wang (P. R. China)

VI-39 Evaluation of Extinction Mechanism and Dynamic Characteristic of Creeping Discharge Type Arrester by Laser Thomson Scattered Measurement
S. Futatsuki, T. Okamura, M. Otsubo, C. Honda (Japan)

VI-40 Development of Long Flashover Arresters with Multi- Electrode System for Lightning Overvoltage and Conductor-Burn Protection of 6 to 35 kV Overhead Lines
G. V. Podporkin, V. Pilshikov, A. Sivaev (Russia)

VI-41 Modeling of Metal - Oxide Distribution Surge Arresters with An Intentionally Connected Series Gap
H. Ortiz, H. Ibañez, C. A. Avendaño, F. Roman (Colombia)

VI-42 Study of Degradation of Surge Arresters of Oxide of Zinc Type Distribution.
H. I. Olaya, C. A. Avendano, H. O. Suaraz (Colombia)

VI-43 Application Technology of Lightning Arrester for 275kV Transmission Lines
K. Tsuge, H. Yamada (Japan)

VI-44 Lightning Overvoltage Analysis of Surge Arresters Installed on 35-kV Transmission Line Without Shielding Wires
Y. Tu, Y. Zhang, R. Shi, L. Ding, Q. Wang (P. R. China)

VI-45 Mitigation Method of Instantaneous Voltage Drop with Line Arrester
H. Kawamura, K. Shinjo, T. Araya (Japan)

VI-46 Application of Surge Arresters on The 154 kV Transmission Line and It's Monitoring System
J.-S. Kwak, E.-B. Shim, J.-W. Woo, Y.-W. Kang, J.-D. Moon (Korea)

VI-47 Influence of The Frequent Discharge on ZnO Surge Arrester Characteristics for Shinkansen Power System
H. Hayashiya, Y. Sakuraba (Japan)

VI-48 Performance of ZnO Surge Arrester Blocks Under Combined DC Plus 60 Hz AC Voltages
B.-H. Lee, S.-B. Lee, Y.-H. Baek, K.-S. Lee, S.-M Kang (Korea)

VI-49 Review of Surge Arresters for 66-1,000kV Substaions and JEC Standard in Japan
S. Shirakawa, S. Nishimura, S. Kojima, M. Kobayashi, H. Kado, T. Kobayashi (Japan)

VI-50 Development of The Estimation Method of The Overhead Ground Wire Inspection Section Using LLS (IMPACT)
Y. Houda, Y. Takagi, K. Fujimoto, T. Yukino (Japan)

VI-51 Field Test of Lightning - Damaged Indicator for Overhead Ground Wire
H. Saito, M. Arakane, M. Shimizu (Japan)

VI-52 Effects of Lossy Ground on Characteristic Impedance of Power Transmission Lines
N. Hejazi Alhosseini, A. Shoory, S. H. H. Sadeghi, R. Moini (Iran)

Topic VII: Lightning Protection of Electronic Systems

Session VII-A: Surges and Their Effects on Electrical Installations

Wednesday, 20 September *8:30-10:30*

Chairman: E. Montandon (EM Consultant, Switzerland)
Moderator: F. Heidler (University of the Federal Armed Forces Munich, Germany)

VII-1 Measurement Results of Lightning Surge Current on AC Mains Line Connected to Access Network Equipment
H. Yamane, T. Tominaga, J. Kato, K. Murakawa, K. Tajima (Japan)

VII-2 Numerical Electromagnetic Analysis on Lightning Current Distribution Inside of Directly Stricken Building
S. Miyazaki, M. Ishii (Japan)

VII-3 Experimental Investigations of Lightning Overvoltages in Circuits Protected by Selected Measures
B. Kuca, D. Krasowski, Z. Flisowski, F. Fiamingo, C. Mazzetti (Poland)

VII-4 Damages at Electrical/Electronic Equipment Caused by A Lightning Stroke at A Great Distance
K. Scheibe, J. Schimanski, M. Wetter, H. Altmaier (Germany)

VII-5 Overvoltage Hazard for Internal Installations and Equipment Due to Direct Lightning Strikes to The LPS of Structures
M. Loboda, D. Krasowski, K. Sobolewski, Z. Flisowski (Poland)

VII-6 Surge Protection of Low-Voltage Systems Connected to Overhead Line
I. Uglesic, V. Milardic (Croatia)

VII-7 A Review of The Requirements Governing The Installation of Surge Protective Devices on The US Electrical Distribution Network
A. J. Surtees, M. Caie, V. Murko (USA)

Session VII-B: Surge Protective Devices

Wednesday, 20 September *11:00-13:00*

Chairman: E. Montandon (EM Consultant, Switzerland)
Moderator: F. Heidler (University of the Federal Armed Forces Munich, Germany)

VII-8 High Energy Lightning Impulse Discharge Capability Metal Oxide Varistors
A. Štagoj, M. Vladimir, A. Pirih (Slovenia)

VII-9 Development of ZnO Disks with High Energy Withstand Capability for Low Voltage Surge Protective Devices
N. Tsukamoto, Y. Wakahata (Japan)

VII-10 Proposal of Rectification Type Decoupling Element for Current Capacity Coordination Between Surge Protective Devices
H. Shimizu, N. Watanabe, H. Fujita (Japan)

VII-11 The Ability of Different Simulation Models to Describe The Behaviour of Metal Oxide Varistors
B. Zitnik, M. Zitnik, M. Babuder (Slovenia)

VII-12 Monolithic Balance-Type Surge Protective Device
R. Oka, H. Sato (Japan)

VII-13 Performance of Low Voltage Varistors Under Repetitive Current Impulse Environment
M. Edirisinghe, V. Jeyanthiran, M. Fernando, V. Cooray (Sri Lanka)

VII-14 Dynamic Performance of Arresters
J. Meppelink, J. Trinkwald (Germany)

Session VII-P: Poster Session

Tuesday, 19 September *10:00-13:00*

VII-15 Calculation of Lightning-Induced Voltages Inside The Structure Using Engineering Return-Stroke Models
G. Maslowski, R. Ziemba (Poland)

VII-16 Experimental Study of Lightning Protection Design Using A Surge Protective Device in Panel-Board
N. Watanabe, H. Shimizu, Y. Makibayashi (Japan)

VII-17 Lightning Protection Improvements on Security Camera Systems Installed in Electric Power Substations
A. R. Nobrega, N. C. Silva (Brazil)

VII-18 Practical Issues of Metal-Oxide Varistor Modeling for Numerical Simulations
N. Suljanovic, A. Mujcic, V. Murko (Bosnia and Herzegovina)

VII-19 Experimental Study for The Application of Zinc Oxide Type Class I SPD
M. Shiozaki, S. Shiga, K. Otsuki, Y. Shimojima (Japan)

VII-20 Discharge Capability and Residual Voltage of Class I and Class II SPDs
J. Schimanski, H. Heckler, M. Wetter, K. Scheibe (Germany)

VII-21 Design of SPDs Class I for Low Voltage Electric Systems, Using Combination of Metal Oxide Varistors
C. Avendano, H. Ibanez, H. Ortiz (Colombia)

VII-22 Malfunction Area Map of Telecommunication Systems Due to Lightning Surge
N. Aoki, T. Tominaga, K. Tajima, H. Yamane (Japan)

VII-23 Coordinating Surge Protective Devices with Metal-Oxide Varistors at Direct Lightning Stroke. Application Note
V. Murko, A. Stagoj, N. Suljanovic, A. Mujcic (Bosnia and Herzegovina)

VII-24 Proposal on Graphical Analytical Method How to Estimate Energy Coordination of Multistage Surge Protective Device
H. Kijima, K. Taketani, R. Tobisawa (Japan)

Topic VIII: Lightning Deleterious Effects

Session VIII: Lightning Deleterious Effects

Tuesday, 19 September *14:00-16:00*

Chairman: Z. Flisowski (Warsaw University of Technology, Poland)
Moderator: F. Rachidi (Swiss Federal Institute of Technology, Switzerland)

VIII-1 Evaluation of The Risk of Damage and Its Application for Standardization of Lightning Protection
T. Horvath (Hungary)

VIII-2 Development of A Complete Risk Analysis Calculator Based on The IEC 62305-2 Risk Management Document
A. S. Diskson, I. R. Jandrell, J. M. Van Coller (South Africa)

VIII-3 Comparison of Lightning Risk Calculation Results Using Different Software Based on New Standard IEC 62305-2
M. Loboda, M. Szewczyk, Z. Flisowski (Poland)

VIII-4 On Lightning Risk Management
T. Shindo, T. Suda (Japan)

VIII-5 Application of Preventive Measures in Lightning Protection
A. Gulyas, B. Nemeth, S. Szonda, I. Berta (Hungary)

VIII-6 Examples of Direct Lightning Hazards and Their Scientific Analyses
M. Kompacher, G. Kindermann, S. Pack (Austria)

VIII-7 Perforation of Metal Sheets Due to Lightning Arcs
D. A. Gonzalez, F. Noack, F. Berger, M. Rock (Germany)

Session VIII-P: Poster Session

Tuesday, 19 September *10:00-13:00*

VIII-8 Lightning Risk Analysis on French Nuclear Power Plants
P. Duquerroy, P. Baraton, F. Audran (France)

VIII-9 Application of IEC 62305-2 in France on Various Plants Proposals for Improvements
A. Rousseau, P. Gruet (France)

VIII-10 Lightning Accidents and Awareness in South Asia: Experience in Sri Lanka and Bangladesh
C. Gomes, M. Ahmed, F. Hussain, K. R. Abeysinghe (Sri Lanka)

VIII-11 Developing A Lightning Awareness Program Model for Third World Based on American-South Asian Experience
C. Gomes, R. Kithil, M. Ahmed (Sri Lanka)

VIII-12 Analysis of A Lightning Accident Considering A Modified Human Body Model
F. Santamaria , A. Alarcon, F. Roman (Colombia)

VIII-13 Characteristics of Lightning Hazards in Guangdong Province China
Z. Huang, S. Yang, L. Chen, X. Huang (P. R. China)

Topic IX: Practical and Specific Lightning Protection Problems

Session IX-A: Railway Systems and Home Appliances

Tuesday, 19 September *8:30-10:30*

Chairman: I. Berta (Budapest University of Technology and Economics, Hungary)
Moderator: W. Zischank (University of the Federal Armed Forces Munich, Germany)

IX-1 Real-Time Decision Support Against Lightning Hazard in Railways
H. Takeuchi, T. Shozawa, M. Okai (Japan)

IX-2 Development of Lightning Surge Sensor for Railway Signal Control System
T. Hattori, R. Ishima, T. Kunifuji, Y. Hirano, H. Sugahara (Japan)

IX-3 Lightning and Overvoltage Protection Concept for Urban Transportation Systems
B. Richter, S. Schafer (Switzerland)

IX-4 Estimation of Occurrence Frequency of Lightning Damages on Railway Level Crossing System in Japan
H. Arai, K. Sato, Y. Hirano, H. Sugahara (Japan)

IX-5 Damages on Home Electric Appliances Due to Lightning in Japan
T. Hosokawa, S. Yokoyama, T. Yokota, Y. Tsutsumiuchi, M. Soeda, K. Sacoda (Japan)

IX-6 Experimental Study on Effect of Lightning Surge Invasion into Electrical Appliances
M. Soeda, T. Hosokawa, M. Ikuta, S. Yokoyama (Japan)

IX-7 Lightning and Surge Protection for Photovoltaic Applications - Performance Tests of PV-Modules and DC-AC-Converters
J. Birkl, B. Schulz (Germany)

Session IX-B: Buildings and Miscellaneous

Tuesday, 19 September *11:00-13:00*

Chairman: I. Berta (Budapest University of Technology and Economics, Hungary)
Moderator: W. Zischank (University of the Federal Armed Forces Munich, Germany)

IX-8 Lightning Protection of Metal Roofs
J. Meppelink, M. Benzin (Germany)

IX-9 Effect of Direct Lightning Strike in The Down Conductors Embedded into The Reinforcement
D. Kokkinos, N. Kokkinos, J. Koutsoubis, M. Klabana, A. Triantafillides, C. Charalambous (Greece)

IX-10 Investigation on The Performance of Different Lightning Protection System Designs
N. Kokkinos, I. Cotton (Greece)

IX-11 Lightning Protection of Mobile Services Switching Centres
N. Szedenik, I. Kiss, L. Babits, I. Berta (Hungary)

IX-12 On Reducing The Internal Voltages and Currents Due to Lightning Transients in Buried Shielded Cables
N. Theethayi, R. Thottappillil (Sweden)

IX-13 Understanding The Point Discharge DC Current Produced By Corona Needles
L. Arevalo, M. Becerra, F. Roman (Colombia)

IX-14 Design of A Re-Usable Rocket for Triggered-Lightning Experiments
M. D. Grant, K. J. Nixon (South Africa)

Session IX-P: Poster Session

Monday, 18 September *14:00-17:00*

IX-15 Study of Artificial Lightning Test to Maglev Vehicle
M. Okai, H. Tsunoda, H. Oshima, H. Matsubara (Japan)

IX-16 Development of Lightning Protection in Electric Railway
M. Okai, T. Syozawa, K. Sasaki (Japan)

IX-17 Experimental Study on Effect of Lightning Surge Invading into A Fax Machine
Y. Tsutsumiuchi, T. Hosokawa, M. Soeda, M. Ikuta, N. Vasa, S. Yokoyama (Japan)

IX-18 Lightning Protection System for Earth Simulator Super Computer
K. Fujito, A. Sato, Y. Murano, H. Okamura, T. Tsuchida (Japan)

IX-19 Lightning and Surge Protection of Cellular Transmit Sites
D. Kokkinos, N. Kokkinos, I. Vlaseros, K. Dimas, M. Koulizos, P. Garoufalis, J. Sotiriadis (Greece)

IX-20 Lightning Protection of Cable Bridges
D. Kokkinos, G. Valirakis, N. Kokkinos, C. Charalambous, I. Cotton (Greece)

IX-21 New Data About Lightning Damages in Portugal and Navarra (Spain)
R. Rodrigues, C. Soares, M. Agiadp (Spain)

IX-22 Application of A Methodology for Ranking Sensitive Equipment Sites for Pro-Active Modifications on Lightning Protection Systems
A. P. Soares, A. R. Nobrega, R. C. Marcos (Brasil)

IX-23 Alternative Method to Measure Lightning Current Distribution in Telecommunication Sites
A. H. Samad, A. N. Johar, A. M. Ramli (Malaysia)

IX-24 Lightning Protection for Mobile Base Stations
M. Sato, T. Matsui, K. Sasaki, K. Amagasaki (Japan)

IX-25 An Example of Investigation in Lightning Damage on Micro-Radio Steel Tower Station and Proposal of Countermeasures
T. Sato, S. Yanagawa, H. Kurita (Japan)

IX-26 Improvement of The Output Current Response of An Electrostatic Fast Impulse Current Generator
D. Oscar, F. Roman (Colombia)

IX-27 6 Channel Lightning Surge Counter
H. Kato, S. Yanagawa, H. Kurita (Japan)

IX-28 Research of Lightning Surge Effects by Equipotential Grounding Or Isolated Grounding
K. Ichikawa, T. Fukuda, K. Nagata, N. Kuzuoka , H. Arai (Japan)

IX-29 Lightning Protection of A Cable-Stayed Bridge
A. Rousseau, L. Boutillon, A. Huynh (France)

Topic X: Lightning Protection and Lightning Testing Standards

Session X: Lightning Protection and Lightning Testing Standards

Tuesday, 19 September *16:30-18:30*

Chairman: C. Mazzetti (University of Rome "La Sapienza", Italy)
Moderator: A. Rousseau (Assistance Protection System, France)

X-1 Analysis of Necessary Separation Distances for Lightning Protection Systems Including Natural Components
F. H. Heidler, W. J. Zischank, A. Kern (Germany)

X-2 Discussion on TOV Test of Voltage Switching Type SPD Specified by IEC 61643-1
H. He, C. Dai, Q. Meng, T. Feng (P. R. China)

X-3 A Review of The Current Test Methodologies for Surge Protective Devices - A Comparison of IEC and UL Test Methods
A. J. Surtees, H. Bachl, A. Rousseau (USA)

X-4 A Probabilistic Approach to The Selection and Location of Protection Measures Against Lightning Overvoltages
G. L. Amicucci, F. Fiamingo, C. Mazzetti, G. B. Lo Piparo, Z. Flisowski (Italy)

X-5 Lightning Protection Guides of Power Systems in Japan
T. Shindo, H. Motoyama, H. Matsubara, A. Asakawa, S. Yokoyama (Japan)

X-6 Standards for Lightning Protection in Telecommunication Systems and Issues for Its Application in Japan.
M. Hattori, F. Amemiya, T. Mori (Japan)

Session X-P: Poster Session

Monday, 18 September *14:00-17:00*

X-7 Volt-Time Characteristics Reproduction of MV Line Insulation Under Impulses Similar to Lightning Induced Overvoltages
A. Ancajima, A. Carrus, E. Cinieri, C. Mazzetti (Italy)

X-8 Connection Components of The Lightning Protection System Tested Using An Infrared Camera
R. Chybowski, M. Bednarek, J. Rybinski, A. Jokiel (Poland)

X-9 Development of A 3D Lightning Protection Diagnosis System
M. Ohba, H. Sato, K. Aoki (Japan)

X-10 Broken Mechanism of Straight Cu Conductors Due to Lightning High Impulse Current
X. Hu, S. Tashiro, T. Otsuka, T. Iwao, T. Inaba, C. Lederle, J. Kindersberger (Japan)

X-11 A Coupling/Decoupling Network for Lightning Surge Test in High-Speed Communication Lines
H. Kawano, T. Tominaga, M. Masugi, S. Kanno, H. Yamane (Japan)

X-12 A Comparison of Surge Requirements for Telecommunication Equipment Signal Ports of EN 300386, GR-1089-CORE and ITU-T K Series
C. Dai, H. He (P. R. China)

Topic XI: Lightning Protection of Wind Turbines

Session XI-A: Blade Damage and Protection

Tuesday, 19 September *14:00-16:00*

Chairman: D. Agoris (University of Patras, Greece)
Moderator: T. Sorensen (DONG Energy, Denmark)

XI-1 Experimental Study on Lightning Attachment Manner Considering Various Types of Lightning Protection Measures on Wind Turbine Blades
N. J. Vasa, T. Naka, S. Yokoyama, A. Wada, A. Asakawa, S. Arinaga (Japan)

XI-2 Investigation Between Electrostatic Field Analysis and Results of Lightning Discharge Experiment with Wind Turbine Blades
T. Naka, N. J. Vasa, S. Yokoyama, A. Wada, S. Arinaga (Japan)

XI-3 Experimental Study on Lightning Protection Methods for Wind Turbine Blades
S. Arinaga, K. Tsutsumi, N. Murata, T. Matsushita, M. Shibata, K. Inoue, Y. Korematsu, Y. Ueda, Y. Suguro, S. Yokoyama (Japan)

XI-4 New Test Method for Evaluating The Lightning Protection System on Wind Turbine Blades.
S. F. Madsen, J. Holboll, M. Henriksen, K. Bertelsen, H. V. Erichsen (Denmark)

XI-5 Discharge Phenomena in The Tip Area of Wind Turbine Blades and Their Dependency on Material and Environmental Parameters
J. Holboll, S. F. Madsen, M. Henriksen, K. Bertelsen, H. V. Erichsen (Denmark)

XI-6 Reproduction and Test Method of FRP Blade Failure for Wind Turbine Generators Caused by Lightning
M. Hanai, H. Koyama, N. Kubo, Y. Hashimoto, I. Suzuki, Y. Ueda, H. Sakamoto (Japan)

XI-7 Lightning Failure Protection of FRP Blades for Wind Power Generators
H. Sakamoto, N. Kubo, Y. Hashimoto, I. Suzuki, Y. Ueda, M. Hanai (Japan)

Session XI-B: Observation and Assessment

Tuesday, 19 September *16:30-18:30*

Chairman: D. Agoris (University of Patras, Greece)
Moderator: T. Sorensen (DONG Energy, Denmark)

XI-8 Observation of Winter Lightning Striking A Wind Power Generation Tower and A Lightning Tower
H. Sakurano, M. Hashimoto, K. Nakamura (Japan)

XI-9 Risk of Lightning Strike to Wind Turbines for Maintenance Personnel Inside The Hub
B. Lewke, F. Krug, J. Kindersberger (Germany)

XI-10 How to Verify Lightning Protection Efficiency for Wind Turbines? Testing Procedures for Lightning Protection Components
J. Birkl, C. Frey, P. Zahlmann (Germany)

XI-11 Research into Lightning Damages and Protection Systems for Wind Power Plants in Japan
M. Minowa, M. Minami, M. Yoda (Japan)

XI-12 A Study of Lightning Overvoltages in Wind Turbine Generation Systems
K. Yamamoto, T. Noda, S. Yokoyama, A. Ametani (Japan)

XI-13 FDTD Analysis of Wind Turbine Earthing
Y. Yasuda, T. Yoshioka, T. Ueda (Japan)

XI-14 Surge Analysis on Wind Farm at Winter Lightning Stroke
Y. Yasuda, N. Uno, H. Kobayashi, T. Funabashi (Japan)

Session XI-P: Poster Session

Monday, 18 September *14:00-17:00*

XI-15 Study on Damage-Mechanism of Wind Turbine Blades by Lightning Strike
K. Inoue, Y. Korematsu, N. Nakamura, T. Matsushita, N. Murata, T. Kuroiwa, M. Shibata, Y. Ueda, S. Arinaga, Y. Suguro (Japan)

XI-16 Breakdown Test of Wind Turbine Blade for Improved Lightning Protection
S. Sumi, H. Aichi, K. Horii, M. Yoda, M. Minami, M. Minowa (Japan)

XI-17 New Lightning Protection for Wind Turbine Blade
Y. Ishige, N. Usui, T. Tamagawa, R. Shimada, M. Hanai, N. Takahashi (Japan)

XI-18 The Observation and A Study of Direct Lightning Stroke Current Through The Wind Turbine Generator System
Y. Shiraishi, T. Otsuka, H. Matsuura (Japan)

XI-19 Activity Report on Study of Lightning Protection Measures for Wind Turbine Generator(WTG)
M. Furue, R. Maruyama (Japan)

XI-20 Study on Improvement of Performance of Wind Power Generation System and Lightning Damage
M. Ideno, K. Seki (Japan)

XI-21 Measurement of Overvoltage Generated in Equipments Inside Wind Turbine
K. Hanaya, S. Enomoto, Y. Watanabe, S. Yanagawa (Japan)

XI-22 FDTD Analysis on Ring-Shaped Lightning Conductor for Wind Turbine
Y. Yasuda, T. Fujii (Japan)

XI-23 A Study of Lightning Overvoltages in A Pole-Mounted Transformer Connected to A Small Wind Turbine Generation System
K. Yamamoto, M. Morimoto, K. Tamura, N. Mori, A. Ametani (Japan)